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SLICES FROM A LONG LOAF

By H. C. STIEFEL

"Fiction (American)"

11

June

Oh, for a book and a shady nook
Either in door or out,
With the green leaves whisp'ring
overhead,

Or the stout cups all about,
Where I may read all at my
ease

Both of the new and old,
For a jolly good book whereon
to looke
To better to me than gold!

✓ Fiction (American)





"TALKED MUSH TILL THE ROOSTERS CROWED."

SLICES
FROM A LONG LOAF.

BY

H. C. STIEFEL, Ph. D.

Log-Book of an eventful voyage by five Pittsburg tourists down the beautiful Allegheny River, from Oil City to Pittsburg, with a few extra chips thrown in that may help to serve as a diversion. A memorable cruise amid unrivalled natural scenery, through a historical country that has now become the World's Industrial Centre.—Facts and figures about Pittsburg's greatness.—Many things that happened *en route*, humorous and otherwise, and a few that are supposed to have happened in other days gone by.

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NEW YORK:
J. S. OGILVIE PUBLISHING COMPANY,
57 ROSE STREET.

Revised.

THE
PUEBLO
39883A
A
FILED
R

To
MY PARTNER,
Who has shared my camps, in rain and shine,
for many years.

1893

—

CONTENTS.

| SLICES | PAGE |
|---|------|
| I.—We see a little of Pittsburgh and then go to Oil City..... | 9 |
| II.—We have a boat, but not enough water to float it—Some facts about petroleum..... | 19 |
| III.—We take a German lesson—Moonlight and “moonshine”—Some “bells” and “yells”... | 35 |
| IV.—We hear the wail of a Kinglet—Franklin and its oil—The humors of rowing..... | 49 |
| V.—We catch a large fish and eat chowder..... | 60 |
| VI.—We are told a love story, which is not much of a love story, after all..... | 72 |
| VII.—We run into a “squall” and listen to some interesting history..... | 88 |
| VIII.—We strike Kittanning and Ford City, and see how plate glass is made—Experiments in resuscitating the “apparently drowned”.... | 100 |
| IX.—We have a great green-corn feast—An awful dream—Adventures of the rain-drops—Freeport, Tarentum and Natrona..... | 114 |
| X.—We land at New Kensington—Aluminum making—The “euphony” of names—A story of Jupiter and Neptune—Jo-boats—American and European housewives..... | 133 |
| XI.—We learn details of a fierce Italian feud at Verona—The true story of Romeo and Juliet—A Scrubgrass episode..... | 145 |
| XII.—We reach city limits—Particulars of a terrible time in England..... | 158 |
| XIII.—We encounter a wild tribe—The Workshop of the World—Iron and steel, and other things—George Washington’s adventure..... | 167 |
| XIV.—We go through the Workshop—King Coal and a few facts—Finish of the Loaf..... | 186 |

ILLUSTRATIONS.

| | PAGE |
|--|------|
| "Talked Mush till the Roosters Crowed" . . . <i>Frontispiece</i> | |
| A Clear Day in Pittsburg | 16 |
| "Like a Pack Mule— | 21 |
| "—or a Letter Carrier" | 23 |
| "The Inclined Railways were Built" | 32 |
| "Fight Snakes or Play with Wildcats" | 44 |
| "Drilling Through Water First" | 48 |
| "Carl Huzzelmeier" | 53 |
| "And Off You Go" | 54 |
| "Rushes out with Much Violence" | 56 |
| "Covered with Rude Carvings" | 61 |
| "Breakers in Sight" | 64 |
| "How a Fish ought to Look" | 65 |
| "How the Fish did Look | 65 |
| "Got the Ammunition" | 68 |
| Casting Plate Glass | 80 |
| Rolling Plate Glass | 96 |
| House-Boats in Winter | 112 |
| "Began to See-Saw gently" | 120 |
| "I to the Amphitheater" | 128 |
| "The Ancient and Modern Nines" | 136 |
| Arena-Housed Locomotives | 136 |
| Into the City Limits | 144 |
| "Your Right Foot is Stuck Out" | 152 |
| At City Limits | 152 |
| "Wept Tears of Tea" | 163 |
| A River Coal Tipple | 168 |
| A Coal Tow | 174 |
| "Kept as a Curiosity" | 182 |

Illustrations by Covert, Dalrymple, Johnson, Smith and others.

PREFACE.

THIS book was written simply because the author felt like writing it. Of course, like so many other books, it was also written to supply a long-felt want—the kind of a want some of you may have experienced yourselves—some time or other.

There is much truth and some fiction in the book. After reading it over several times himself, the author has come to doubt some of the truth and to believe some of the fiction. The two can be told apart quite readily, however, although, at times, the truth sounds like fiction and the fiction sounds quite plausible.

Like any other loaf, this one may be cut into from either end, or you can start in the middle of it if you desire to.



SLICES FROM A LONG LOAF

SLICE I.

*We see a little of Pittsburgh and then go to
Oil City.*

DEAR READER, kind reader, innocent reader, confiding reader, and whatever else the authors call you, permit me to introduce myself:

I am Anthony Black, A. M., M. D., P. D., R. S., etc., etc., Professor of Isothermic Radiometry of the Eastern State University, member of many learned societies, author of Isotherms in Space, Radiometrics of Energy, etc. So much for my personality. After drilling Isotherms into the heads of my junior students, and Radiometrics into those of the seniors during the college years, you will readily see that I am glad when the time comes to close the lecture room doors for the summer vacation.

Then I leave the city and the college and go out into the country and try to forget, for the time, at least, that there are such things as my special studies.

Thus it came about again that, one spring day, my Partner and I began making plans for our summer outing.

After much discussion we decided to float down some river or other in a boat and to camp out on the road. In this way we would be able to get away from the bustle and noise of the city for a while; we could be cut off from the world for just as long a period as we desired, and still remain within reaching distance of the railroad, telegraph, daily newspaper, telephone and other so-called necessities of the present day.

The only trouble we found was to get just the right kind of river. What we wanted was a nice little bit of a river one or two hundred miles long; one with very few large cities or towns upon its banks; one with very little traffic, so that we could float about at all times without being in danger of running down smaller craft, or of being run down ourselves.

Furthermore, we wanted a river with a number of little towns along its banks, one that offered variegated scenery, mountain and dale, cultivated fields alternating with more or less of the forest primeval. For myself I did not care particularly about the forest, primeval, or any other way, but my Partner wanted it, and that settled that point.

Then, furthermore, our river must not be too deep, nor its current too swift; we did not want a very wide one, but we did want one full of islands,

"You see," said my Partner, "the whole country is just full of rivers, while we are at it we might just as well select one that will fill all requirements."

Then for a few weeks we studied geography. In the course of that time we saw that there were more rivers in America than we had ever dreamed of.

We found long rivers and short rivers, rivers with islands and rivers without, rivers wide and rivers narrow. At last we found just the river we wanted, the Allegheny river in Western Pennsylvania, from Oil City to Pittsburgh. The river is a few hundred feet wide at Oil City and usually about one foot deep. At Pittsburgh it widens to about one-quarter of a mile and has a depth of about six feet.

The river flows East, West, North and South part of the way, then it alters its course and flows West, South, East and North. Now and then it flows in two directions at one and the same time; this is especially the case in the short curves among the hills. Some of these curves are so short that the bow of a lumber raft is often around one end while the stern is out of sight at the other. At such times the raftsmen often become confused and cannot tell which way they are going. Some of the raftsmen tell wonderful tales of how they had gone back up the river for several miles before they discovered their error.

After we had rounded several bends ourselves we almost believed the tale.

Having decided upon the river the next step was

to get a boat. We settled this point in very short order. We simply wrote to Oil City and had a boat built there.

At first we had a boat with a mast and sail in view, but when we considered the extra labor a sail would bring we dropped the idea quickly.

Of course, not all people would call sailing a boat work; there are a great number of men who really think it great sport to gad about on the water in a sailboat. They are quite happy when she luffs, or jibes, or sheers off, or when they tack and box the binnacle or do other nautical stunts.

I do not belong to that class. I consider such carryings-on work. When I go a-boating I want to loll about in the boat and let her go just as she wills, fast or slow, upstream or down.

To have some company along, and also to have some one to take unavoidable work off our hands, we took quite a large crew along.

We took, first of all, the navigator. To him we intrusted the management of the boat and all appertaining thereto. Our next selection was an even more important one—a cook.

My Partner and I figured out how nice it would be after a hard afternoon in the boat or on shore, to have some one on hand to prepare supper for us. And then again, how soundly one could sleep at night if he knew that breakfast would be ready for him, early or late, just as he wanted it, the next morning. That is the usual time for breakfast, it is true, but if you go out a-camping you will very soon

discover that the meal hours are not like the laws of the Medes and Persians.

Not wishing to burden navigator and cook with too much work, we shipped a third hand. As each of the other two had his title we called this third one the crew. It would sound nice, later on, in talking of our trip, to mention the crew, incidentally—how we had the crew do this or that, what an exceptionally efficient crew we had the good fortune to engage, and so on. Further details regarding the crew, either numerically, or otherwise, we would of course omit.

Having made all plans, and receiving word from Oil City that our boat was built and awaiting us, we left Pittsburgh for Oil City by way of the Allegheny Valley Railroad.

A few minutes after leaving the station we caught sight of the river and kept it in view almost uninterruptedly until our destination was reached. For the first ten miles or so furnaces and mills of all kinds line its banks, side by side at first, with barely room here and there for a street down to the water. Farther on dwelling houses are seen here and there, wedged in between the mills, then a vacant lot or two makes a gap in the line. At last a field with growing crops is seen and then we roll out into the country—and sunshine. Not that there is no sunshine in Pittsburgh. They have what they call sunshine there at times. This happens now and then on a Sunday in summer—when the innumerable

furnaces have slowed down over Saturday night for the Sunday rest.

On such days Pittsburghers like to climb to the top of one of the high hills surrounding the city and gaze rapturously at a huge red ball in the sky, that glows dully through the haze. Then they say to one another: "A glorious day; how bright the sun shines!"

In former times the high hills in and about the city offered the Pittsburghers a unique amusement. They held what the staid burghers called Swiss parties, the participants in this sport would assemble at a rendezvous and then the ascent of one of the high hills would be made.

For these excursions it was expected that each participant would appear in appropriate costume, the men in knee breeches and thick woolen stockings, felt sugar-loaf hats with genuine Gockel feathers nodding proudly from them. A short green jacket covered a white shirt upon which a broad red belt showed up bravely. The gentler sex was, of course, in appropriate costume also, in Mieder, corded and bangled. They all carried long alpen-stocks.

At times one of the party would halt, rest both hands upon the hips and then let a loud, clear yodle ring out, another would join in and another, until the hills echoed back the pleasant melody.

Arrived at the summit of the peak they would partake of refreshments sent up in advance. Home again, the date of the ascent and the name of the

peak would be carved deeply into the alpenstock; some humorists would even put the names of Swiss mountain peaks upon theirs. In later years they would then proudly show their alpenstocks and say, in a quiet, unassuming way:

“Yes, that’s my tried and trusty old alpenstock, it helped me up the Matterhorn, the Rigi, the Yungfrau and many other Swiss peaks. I remember a little adventure, etc., etc.”

In course of time the hollows and valleys in and about the city became covered with dwelling houses. These gradually spread on up the sides of the hills to their very tops. As mountain climbing then became a necessity it ceased being a pleasure, the Swiss parties died out. Finally the inclined railways were built. There are now a dozen of these hillside railroads in and about Pittsburgh, carrying passengers up and down the hills rapidly and safely.

A steam engine at the top of the hill furnishes the motive power. The cars are attached to a heavy wire cable. This cable runs over a large wooden drum and as it is wound or unwound the car goes up or down. Some of the cars carry only passengers; others are arranged to carry vehicles also.

But let us get back to the railroad. After a pleasant ride of five hours we arrived at Oil City, where the river trip was to commence.

“I guess they call the town Oil City on account of the oil,” said the cook, who had noticed the many oil well derricks near the town.

This was the navigator's cue. He had been waiting for it and was just bubbling over with information regarding petroleum.

"That is correct," said he. "Before the year 1859 Oil City was comparatively unknown. With the discovery of petroleum in that year in that region, Oil City really sprung into existence and grew with the rapidity peculiar to towns in our oil and mining regions. A wheat field or barren plain one day; a city with paved streets, banks, schools, churches and an opera house the next."

"Did they have no petroleum at all before they found it near Oil City?" queried the crew.

"Oh, yes," continued the navigator, "petroleum was found along the shores of the Dead Sea seventeen hundred years before the advent of Christ. The Egyptians knew its value, the Greeks used it as an illuminant in the seventeenth century, getting the oil from the island of Zante. A small well on the banks of the Tegern Sea in Germany has been producing small quantities of oil since the year 1430.

"Here in America petroleum has been known for centuries. The first authentic account of a systematic search for it dates from September, 1700. In that year the Governor of the Province of New York issued instructions to Colonel Romer, 'His Majesty's Chief Engineer in America,' to examine the territory in Seneca County as to the foundation for certain reports of the appearance of oil in considerable quantities there.



"A CLEAR DAY IN PITTSBURG"

THE
PUBLIC LIBRARY
ASTOR LENOX
TILDEN FOUNDATIONS

"In a letter from Pittsburgh, dated September, 1779, Colonel Brodhead writes as follows: 'Upon our return we crossed a creek about ten miles above Venango remarkable for an oil liquid which oozes from the sides and bottom of the channel, resembling British oil.'

"Finally, in August, 1785, General Irvine writes: 'Oil creek has taken its name from an oil or bituminous matter which is found floating on its surface. Many cures are attributed to this oil by the Indians and lately by some whites; particularly rheumatic pains.'

"In 1857 Colonel Ferris, of Tarentum, Pa., while working salt wells at that place, collected some of the oil from the surface of the salt water and sent it to New York to be refined.

"Two years later, he, with S. M. Kier, of Pittsburgh, founded the Seneca Oil Co. of Tarentum. This was the first concern to refine petroleum in the West.

"Before that time Mr. Kier had placed the crude oil upon the market, in small bottles, for medicinal purposes. The bottles were labeled:

| |
|--|
| <p>Kier's Petroleum OR Rock Oil.</p> |
|--|

"A natural remedy procured from a well in Allegheny County, Pa., 400 feet below the earth's surface.

**“This healthful balm from nature’s veriest spring,
The bloom of health and life to man will bring,
As from her depths the magic liquid flows
To calm our sufferings and assuage our woes.’**

“Colonel Ferris called his oil ‘Carbon Oil’ and sold it at eighty cents per gallon.

“In 1859 Colonel Drake opened up the Oil Creek region and drilled the first well at Titusville, eighteen miles north of Oil City.”

“I think that will do for a little while,” said my Partner. “I like a little talk on scientific topics, at times, but just now I would rather discuss dinner. After that we had better look up our boat, get our supplies and then start on down the river.”

SLICE II.

*We have a boat, but not enough water to float it—
Some facts about petroleum.*

AFTER dinner we all tramped down to the boat-house where our craft was moored. The various members of our party made all kinds of remarks when they saw her.

The navigator looked the craft over critically, very critically, then he said: "That ain't a boat! that's a mud scow." "That's a stone barge," said the cook. "That's the nautical 'What is it?'" said the crew. "What a darling boat," said my Partner; "she is so nice, and broad and flat. She won't upset in the river and the seats are so nice and wide. But where are the bells? Not hung yet?"

"The what?" gasped the navigator. "Why, the bells," replied my Partner. "On all voyages I have ever read about, some one is always striking eight bells. Now, where are our eight bells? How can we strike 'em if we haven't got 'em?"

We finally compromised on one bell. It was hung over the stern of the boat and afforded my Partner much amusement later on. As my Partner didn't

known whether eight bells meant six o'clock, or three bells meant ten o'clock, we had a lot of trouble keeping track of time.

If the navigator took an observation and made it high noon, my Partner usually made it an hour or two later or earlier, because it had just struck that much on the bell.

Then the navigator would explain that we were at that moment sailing due east or north by southwest, or something else, and would prove by longitudinal calculations that the sun couldn't keep track of us and that the real time lay off to the right about seventy-two feet, and that we were sailing upon what mariners called the mean time.

In fact, the navigator knew so much about boats and boating that the cook called him a second Admiral Crichton.

But to return to our boat. "What is her name?" was the next question put by Partner.

"Name!" said the navigator. "Give such a thing a name? Only one name will do, and that's Liana, a creeper. That's all she'll ever do."

I had other names in view, but I held my peace and let it go at Liana. The various remarks made by the members of the party describe the boat sufficiently. A boat of this build has, however, its great advantages. It will float in very low water, and it can be loaded down like a pack mule or a letter-carrier.

I should, perhaps, place the letter-carrier first, as a fellow-man, but I use him here merely as a load

carrier, and in this capacity he does not come up, quite, to the pack mule.



"Like a Pack Mule."

Be it added that there were seats at the bow and stern, boxed in to form small lockers, and a seat each for navigator, cook and crew. My Partner described these three seats in a peculiar nautical way. According to this description, the cook's seat was amidships, the crew's seat was fore of aft, while that of the navigator was aft of fore.

Oarlocks corresponded to the seats; not, however, that we intended to do much rowing. I, for my part, always exert myself too much when I row. I feared that if I rowed we would get down the river in too short a time. So I decided right at the start to have nothing at all to do with this part of the excursion.

My Partner, on the other hand, exerts one side too much in rowing. In consequence the boat describes a constant series of circles. This is very funny, indeed, for a little while, but when you start on a long row like ours, this slow waltz movement would become monotonous in time. And then we had to pay some little attention to the time occupied in getting down to Pittsburgh. We did not want to arrive there in too short a time, but still we wanted to get there some time during the summer.

We tried to figure out how long it would take us to get down if my Partner rowed all the way. Of course, the current would take us down, without any rowing at all, at the rate of three miles an hour. But we had to bear in mind that each circle rowed by my Partner would take us up stream again a certain distance. Finally, the navigator announced



"Or a Letter-Carrier."

that if my Partner rowed for two days we would be three miles, fourteen and one-half feet above our starting point at the end of that time.

We excused my Partner from rowing.

My Partner and I then decided to leave the rowing entirely to the triumvirate. It was perfectly willing to do so, especially the crew, who had never had an oar in his hands.

While we were looking over our boat we were joined by a weather-beaten mariner who had been painting a skiff nearby. He entered into conversation with the navigator and showed great interest in our affairs. He wanted to know who we were and where we came from. He asked if we were leasing oil lands or prospecting. When he saw the load of tin cans, in which we had packed part of our edibles, he asked if we were peddling tinware.

Finally, he winked both eyes violently several times and said:

"Goin' down the river?"

"Yes," answered the navigator.

"Goin' down the river in the boat?"

"Yes."

"Now, what might she dror? I ask."

"Eight inches."

"'S that so? Goin' down by rail or with a team?"

The navigator gave him a withering look and then said, oh, so coolly and quietly: "We are going to row down the river in the boat."

"'S that so," replied the mariner. "Goin' down in the boat an' she drors eight inches, loadened, an'

the river here has only six inches, and down at the riffle she has only four! How're you goin' to do it? Shove her down on skids?"

Alas, and again alas, it was only too true, for weeks and weeks it had not rained at the headwaters of the river. It had in consequence kept on falling and falling and falling, so that now that we really looked at it understandingly we saw that it would hardly furnish enough water for lemonade for a barkeepers' picnic.

We were indeed in an awkward fix. A boat without water enough to float it in is a peculiar kind of a luxury. It is even of less value than a cradle without a baby. You can get a baby of some kind or other if you just must have one, without very much trouble, someway or other. But you cannot get water for your boat.

If the boat is large enough you can draw it up on shore and live in it; if it is small enough you can put it in your front yard and plant flowers in it. Of course we could do neither.

We discussed innumerable plans, but none of them showed us any way to raise the water level of the river, and that was the only thing that would help us out of our trouble.

If only a slight rain came in the next day or two we could get off. If not, well, we decided to wait until to-morrow. Time enough for more worry then.

"In the meantime," said the crew, "we might go out and see how they drill oil wells."

So back to the hotel we went. There we made the necessary inquiries, and soon after started out in quest of knowledge. Of course we did not find it necessary to go far to see wells being drilled. We were right in the home of the oil well. Even in the city proper the crew claimed to have seen many backyards with wells in them.

With the discovery of oil, innumerable wells were drilled in all directions about Oil City. This soon led to a sharp definition of the oil-bearing region.

Prospectors knew that if they sank their wells within certain limits they would, in all probability, strike oil. If they went outside of a certain area they might sink a dozen wells before they got one producing enough oil to pay expenses. Still the "Wild Catters," as the prospectors are called who put down wells anywhere and everywhere, kept on putting down new wells and opening up new fields here and there.

Wells were—and are yet—put down in all kinds of places, on the level field, on the side of a hill so steep that horses could barely climb it, or on top of the hill itself; or they drill through a couple of feet of water first, as in California.

Drilling an oil well is a comparatively simple operation. First of all the operator puts up his derrick. This is simply a solid wooden structure like the skeleton of a church steeple, usually about eighty feet high.

A small steam engine to furnish the motive power is stationed about one hundred feet away from the

derrick. It is placed at such a distance from the well hole in order to minimize danger from fire. There is very little danger of the oil itself igniting; its finding is, however, always accompanied, or preceded, by a large or small flow of highly inflammable gas; indeed, some wells produce only gas, and are consequently called "gassers." If a flow of water only comes, then the humorists call it a "dry" hole, or a "duster."

It is on account of this inflammable gas that the engine, with its fire, must be stationed at some distance from the well.

The "bull wheel" is placed between the engine and the derrick. This is a large wooden drum or wheel, revolving upon a wooden axle, a heavy rope runs over it and then up to the top of the derrick; there it passes over a small wheel and then hangs down to the ground inside of the derrick. The heavy iron "drill" is fastened to this end.

This drill is a bar of iron, five or six feet long and about six inches square, its lower end flattened out like a large V-shaped chisel. As each drill weighs almost two thousand pounds it is readily seen that a small steam engine is necessary to lift and lower it. Everything being in readiness the engine is started, the bullwheel revolves and the drill is alternately lifted and allowed to drop; this is kept up day and night; up and down, up and down goes the drill, driving deeper and deeper into the earth with every drop. If only earth is encountered the drill forces its way down very easily and

rapidly; if thin layers of rock are encountered the constant pounding of the heavy drill soon bores a hole through them. If water is encountered, the work is not interfered with; as the drill gets down deeper into the ground cracks and fissures are usually encountered through which the water drains off again.

After drilling a certain time the mud formed by the pounding of the drill in the hole must be removed. For this purpose the driller uses a "mud pump," a long iron tube like a section of rain spouting. This pump is closed at the lower end by a valve, opening inwardly, pressure from below opens it. The drill is drawn out of the hole and the pump lowered into it. In sinking down, the pressure from below opens the valve, the tube fills up with the earth churned up in the water. In withdrawing it, the valve closes and the contents of the pump are drawn out of the hole.

This proceeding is repeated until all the mud has been pumped out of the hole.

To prevent the sides of the well from caving in, or to prevent too much water from flowing in from the sides, the well is "cased," that is, iron pipes, somewhat like the smaller gas pipes in the city streets, and with a diameter large enough to allow the six-inch drill free play, are put into it. Each section of this casing is about eighteen feet long. A first section is lowered and then others are added and screwed together until the well is finished.

The oil is struck at varying depths; in some dis-

tricts it is encountered three hundred feet below the surface, in others it is necessary to drill down two thousand feet and more.

If the well is being put down in a known district or "field," the driller knows to within a few feet how deep he must go before he can get oil; slowly and steadily the drill pounds away, inch by inch, foot by foot, the hole grows deeper; at last the driller feels that his heavy drill has become seemingly lighter, then he knows that he has struck oil and that the hole is filling up with it.

The drill is withdrawn as rapidly as possible, an iron pipe is screwed to the end of the section of casing inserted in the well, through it the well is then connected with the pipe line leading to the storage tank.

It may happen that an underground reservoir of oil is tapped, where the oil is confined under great pressure. Then when the drill forces its way into it the oil rushes out with as much violence as if an opening had been made in a steam boiler in operation. The pressure of the oil is at times so great that the two thousand pound drill is blown out of the well as easily as a boy blows a pea out of a pop-gun. At times a flow of gas only results, a flow so strong and mighty that it seems to be beyond the power of man to curb. Formerly this gas was burned as it flowed from the well; torches were thus formed which were visible for many miles at night-time. Now this "natural gas" is conducted in pipe lines to the towns and cities, there it is used for heating and lighting. At times the oil ceases

to flow out of a well, or the flow diminishes greatly, then the operator usually "shoots" the well.

The oil, as it comes from the earth, is a thick, heavy, green or brown liquid, and bears no resemblance at all to the water-white oil we use in our lamps; it contains a large percentage of tar, paraffine and other semi-solid and solid constituent parts. These, in course of time, clog up the pores and fissures in the rocks and thus prevent the free flow of oil into the well. To open up these clogged rock pores, the driller or operator calls in the aid of nitroglycerine. He "shoots" the well, thereby shattering the rock and thus giving free passage again to the oil.

The nitroglycerine used to shoot the well is poured into long, round tin cylinders, or "shells." Each shell is about six feet long and gets a charge of five gallons of nitroglycerine. Six or seven of these shells usually constitute a "shot."

The nitroglycerine is poured into the shells with but little more precaution than the shooter would use in pouring hot coffee out of his coffee pot into a cup. Constant handling of the explosive has made the shooters utterly indifferent, seemingly, to the risks they run in handling it. They will load a light spring wagon with cans of it and drive about the country with as little concern as if they were hauling so many cans of milk. If the wagon strikes a rock in the road, and gets an extra heavy jolting, it does not worry the driver in the least; he merely feels that he got a little extra shaking up; for his "glycerine" he has no thought whatever. And why

should he worry about it? He has been handling and hauling the stuff for years and never knew it to explode, unless exploded intentionally. One day, however, some section or other of the oil region trembles slightly, window-panes rattle in their frames, then a low, rumbling sound is heard as of distant thunder—

Then quiet.

Later on, a large hole in the road somewhere out in the country, splinters of a light wagon picked up here and there near the hole, a few pieces of harness and a shred or two of a human body, found scattered about, tell of the explosion.

Before shooting a well, short pieces of wood or iron are let down into it so that the explosive charge may rest upon them and not upon the bottom of the well. Care is also taken that a long column of water or oil rests over the charge. The filled shells are lowered carefully, one on top of the other, until they are all in position, then the shooter lets a heavy iron weight, called the "go-devil" suspended by a string from the top of the derrick, drop down into the well upon the upper shell. If the column of water above the top shell is long enough nothing is heard of the explosion except a sharp, clicking sound, the water above the charge acting like a long cushion. If the resistance above the exploding charge is not sufficient, the well for a brief second or two is converted into a huge cannon, then, when the falling weight strikes the top shell you feel a slight trembling under your feet and hear a faint rumbling in the earth.

For a brief moment there is silence, and then a mighty column of oil and water shoots up to the top of the derrick, carrying with it fragments of rock, pieces of shell, sand and whatever else the explosive could find down in the earth that could be torn from its fastenings.

At times a very great increase in the yield of oil follows a shot. Wells that yielded only four or five barrels of oil daily before shooting have yielded one hundred barrels after the shot.

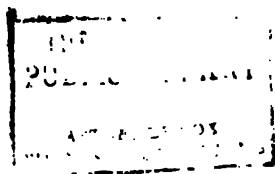
The crude oil from the well is conducted through iron pipes to the storage tanks. Some wells yield the oil under such pressure that it flows into the tanks without any further aid; other wells flow so slowly that the oil must be pumped out of them.

From the storage tanks the oil is sent to the refinery. This may be in the neighborhood or it may be hundreds of miles away. In this last case the oil is pumped through the pipe lines, over and through hills, valleys and rivers. Here and there along the line pumping stations are placed to help along the flow of oil.

At first the crude oil was distilled in large cast iron retorts. An accident, however, showed the proper way of distilling it. Somewhere in New Jersey a refiner was hard at work at his still one winter morning; at noon he built a heavy fire in the furnace and went home to dinner. He was detained at home, however, until late in the evening through sickness; then he hurried back to the refinery, expecting to find it in ruins. To his great surprise he found the fire glowing quietly under the still and a



"THE FACTORY THAT WAS BUILT IN THE MOUNTAINS"



thin stream of clear, white oil flowing from it into the tank. The correct method of heating the oil had been found.

The first retorts, or stills, were quite small; one holding 30 barrels of oil was considered very large indeed. Now a fifteen-hundred-barrel still is a common thing. The stills are simply large iron tanks with outlet pipes leading from their tops through a tank filled with cold water. Here the hot vapors are condensed to benzine and illuminating oil. The oil is pumped into the stills just as it comes from the earth. By regulating the fire under the stills the highly volatile and inflammable parts of the oil (benzine, gasoline and naphtha) are driven off first and collected separately. By further proper firing the illuminating oil comes off next. As it comes from the stills it contains some tarry substances and pitch in solution. These impair its value as an illuminating agent. To remove these impurities the oil is subjected to the action of strong sulphuric acid in large iron tanks. The acid combines with the pitch and tar and settles with them to the bottom of the tank, to be drawn off finally and run off into some convenient river. The oil is then washed with water to remove all traces of acid. As oil and water do not mix voluntarily, a stream of air is blown through the tank containing the mixture, the countless air bubbles churn up the oil and water, and thus bring them into intimate contact. As soon as the blower stops the agitation ceases and oil and water separate into two layers. The water

is run off into the river and the oil is then put into the blue barrels seen all over the world.

The crude oil contains other valuable compounds beside illuminating oil and benzine. All vaseline comes out of the crude oil, for instance.

The millions of many-hued wax candles which grace Christmas trees the world over are made out of paraffine that came out of petroleum.

The largest refineries are on the sea coast. The crude oil is carried to them through pipe lines from the wells. These pipe lines run in all directions. A double line of eight-inch pipes runs from Ohio to the Chicago refineries; a six-inch line runs from the Ohio fields to Cleveland and Buffalo; a double line of six-inch pipes runs from Ohio to Bayonne, N. J. From the Pennsylvania fields larger lines run to New York, New Jersey and Maryland.

These pipe lines lead up and down hills, or under them, over or under rivers, immaterial whether it be a river only a few yards wide or the Hudson river at New York. At times the pipes become clogged up with tar and paraffine, thus diminishing the diameter of the pipe and impeding the flow of oil. When this happens a "go devil" is sent through the pipes. This is merely a metal plug with scrapers attached to it. It is inserted into the pipe line at one of the pumping stations and is then forced along with the oil. As it passes through the pipes its scrapers brush off the coating of tar and carry it along before them to the next station. There the accumulation is removed and the "go devil" is sent on its way to clear another section.

SLICE III.

We take a German lesson—Moonlight and “moon-shine”—Some “bells” and “yells.”

THE next morning we went down and took another look at the river. The gauge showed a half inch less water than the day before. We meditated, deliberated and consulted. Our boat did not get a lighter draught thereby, nor did the river get any deeper. Finally the crew had a bright idea. Said he, “I’ll tell you what we can do; just watch me once.” With that he jumped into the boat. “See,” said he, “she’ll float with me and part of the baggage; now what’s the matter with my floating down in the boat with part of the stuff, while the rest of you walk along until the river gets deeper, then you can get in and ride, one after the other.”

These few words created quite an excitement in our little party. The navigator and the cook used very harsh language toward the crew. My Partner’s remarks were stronger and heavier; they were in German. I am sorry that I cannot translate them. German remarks, especially if they contain nice

long words, must be heard or even seen in the original to be appreciated.

I have always had an especial liking for the long words found in the German language. There is a certain solidity about them which is entirely lacking in our short, matter-of-fact English. Then, again, these long German words are handy things to have about the house or playground. If you want to drive a nail or play ball you can use such a word as a hammer or bat. If necessary, you can use one of them as a clothes pole, fishing line or hitching post.

Another nice thing about them is that any man with but a superficial knowledge of German can build them up for himself.

You start out with a noun and tack an adjective to it, then you add another noun and a few "werde gehabt habens," then you have your foundation and can start building in earnest. Like this, for instance, start with our boat:

1. Nachen—a boat. Now let's tack something to the end of it:

2. Nachenbesitzer—boat owner. Let's add a few more appendages:

3. Nachenbesitzersfamilie—boat owner's family. Now that we have a good start, it's comparatively easy to go ahead:

4. Nachenbesitzersfamilienausflug—boat owner's family excursion. Now again:

5. *Nachenbesitzersfamilienausflugsangelegenheiten*—boat owner's family excursion affair. Having gone so far it is the easiest thing in the world to split the word up somewhere in the middle and insert a few more syllables.

6. *Nachenbesitzersmittsommerfamilienausflugsangelegenheiten*. Or in English—boat owner's family summer excursion affairs.

We start out with a word of five letters and end with one of 56.

Now just imagine a few words like that falling upon the head of our little crew! They would have crushed him to the earth but for the fact that he sat in the boat on the river.

But to return to our *nachenbesitzersmittsommerfamilienausflugsangelegenheiten*—I am really proud of that word—upon the river bank.

I allowed the excitement created by the crew's remark to subside a little and then I made a few remarks myself.

"The idea is not so bad, after all," I said. "We have come out to camp and row, why not add a little walking? We can walk along the shore, as the crew suggests, and when we get tired of walking we can put up our tents and call it a day's work. We will not be compelled to walk more than 15 miles before we will have water enough to float us all, and we can take two whole days to cover that distance, if we feel so inclined."

The crew's suggestion was finally adopted, we turned our backs upon Oil City and started on our trip. For the first few miles we had plenty of fun; seated in the boat, and floating lazily with the current, the crew laughed at us plodding along the shore. Whenever he ran upon a sandbar and had to get out and tug and pull at the boat for ten minutes or so we sat down in the grass and laughed at him. All in all, I think we laughed most. But to return to the river. We tramped along another mile or so and then halted to prepare for our first meal.

Our first halting place was not exactly an ideal camp site. We were not very particular, however, and merely wanted to lie at anchor for an hour or so for a meal. From our camp we could see a little village nestling at the base of the hills a few cable lengths inland, but we scorned the idea of going there for our dinner. We had started upon our sail and tramp and were bound to start in the proper way. We let the village nestle.

They have a strange way of nestling, these villages. Even if they look as if they had been fired out of a shotgun or sprinkled about out of a pepper box, nestle it is and nestle they must.

We called the crew off from labor to refreshments. The Liana was anchored, and then dinner. Our first meal on the road was not a magnificent affair, but we enjoyed it greatly from end to end. The cook wrote out the bill of fare on a shingle. Here is a copy:

Poisson.

(Froid)

Saumon, au can de tin, avec solide croustille.

(Chau)

Pomme de terre, au naturel.

Fromage.

Frutti.

Boef roti, avec solide croustille.

Cafe au lait.

Baie de ronce, au lait, avec sucre.

Foliae nicotianae, in bacillis, *Jenkinsoniae*.

Sounds nice, doesn't it?

Here is what we had, in plain English: A can of salmon and hardtack, potatoes roasted in the fire, canned roast beef and hardtack, cheese, coffee and milk with hardtack, blackberries with milk and sugar. We did not eat crackers with each course, but we had them and could have eaten them if we had desired to do so. After dinner came that *bete noir* of the kitchen, that horrible, nasty, messy, mussy dishwashing, but we had reduced it to a very simple operation, in theory, in advance; our theory worked very well in practice. We simply took our tin plate and cups, our knives, forks and spoons down to the river, a handful of wet sand, a brisk rub or two, a rinse in the flowing river and lo and behold, our table service shone like new. It is true the plates were covered with all kinds of eccentric and concentric rings, sunbursts, geometrical and other figures, but that was just interesting, as we would in this way get a freshly decorated service of

—tin—plate several times each day. After a brief rest we consigned the empty cans to the deep, dishes and provisions were repacked and stored away on board again, the crew got aboard, weighed anchor and turned the bow of the Liana down stream. And we on shore took up the line of march again.

The trees were casting long shadows upon the water when we concluded to stop for the day. The number of miles we had covered was not very great, but we were in no hurry to get anywhere, our hotel was just there where we wanted to have it. Our tents were soon up, crew and cook cut soft boughs for our beds, while the navigator prepared supper. After our meal we just lolled about and did nothing at all.

The day birds hushed their voices gradually, and fluttered about their nests as if they were not quite decided whether it was bedtime or not. A little later the musicians of the night tuned up, the treble of the crickets mingled with the whole scale of the big and little frogs. As it grew darker the navigator piled huge pieces of driftwood upon the fire so that it cast a bright glare far out over the river, where a splash every now and then told us of fishes and fishing. We sat up late watching the play of the firelight and moonshine upon the water, we spoke of the stars and the moon, of moon myths and superstitions. My Partner even grew sentimental and dashed off a little poem about the silvery moon wandering so silently among the clouds. Finally the navigator decided that it was time for him to de

a little talking, he felt hurt because we praised certain moonlight evenings we had passed in Switzerland and Italy.

"You cannot make me believe," said he, "that Europe can produce better moonshine or moonshine effects, than our own America. You need not go to Switzerland to see the moon shine on ice-clad peaks. You can see that out West; same moon, same kind of snow; why should not like and like give like? You hear people rave about moonshine nights upon the Grand Canal. Go and sit on a pierhead in New York City, Brooklyn or Jersey City at nighttime and you will see something worth looking at. There's a puff of bluish white smoke down the Narrows, a faint booming comes to your ears from the sunset gun on Governor's Island. The sun has set. Then comes that busy time 'between lights' on the rivers and in the harbor; see the countless ferry-boats hurrying to and fro, taking the thousands of city toilers toward their homes. A belated ocean steamer comes hurrying in to land her passengers before nihgtfall, a Sound steamer floats majestically by, rounding the Battery in a graceful curve. You cannot see such a sight on the Canal Grand; there you can only see the indolent lazzaroni holding out his hands for alms, usually too lazy to ask for it.

"Then—

"The moon, refulgent lamp of night,
O'er heaven's clear azure spreads her sacred
light.'

"Up the East River a long line of twinkling lights suddenly flash out brightly high in the air. It is the Brooklyn Bridge. As it grows darker you see huge fireflies rushing back and forth upon it; they are only the prosaic passenger cars of to-day, but they add much to the picture.

"Venice has its past, you say. You can sit there and think of past centuries and see the Doges in all their glory gondoling about on the canals.

"Well, our harbor has a past also. Look at that quaint old boat, broad as she is long, almost. That is Mynheer von Pludderhosen's boat come to take him from his work to his Lust Haus on Staten Island. Or that shadowy boat, manned by shadows, standing out in bold relief for one brief second as it passes before the rising full moon—Indians. There's a past for you.

"Go to Kentucky and study moonshine effects there, up in the mountains, far from the teeming haunts of man. Poems and paintings cannot do justice to Kentucky moonshine. Down there it makes people want to do more than make poems or paint pictures. It makes them climb to the tops of the highest hills, fight snakes or play with wildcats or lambs. It makes the old feel young and the young feel younger. It takes men into a fool's paradise one hour, and into jail the next. It makes men love their enemies, or kill them. Moonshine down there has affected men so that they went about on the hills in broad daylight searching for it; they——"

"It is time to retire," said the cook; "that's all moonshine, anyhow.

"Moonshine by the river's brim,
Mere mellow moonshine was to him,
Just this and nothing more."

And then we went to bed.

For a little while I could hear the cook and the crew disputing about some trifle or other in their tent, but gradually their voices grew fainter and fainter and then ceased entirely.

I was asleep and slept as quietly as a little child.

But no, I should say I slept as quietly as a little babe. You fill the innocent little thing up with milk or pap, or some other soft, mushy stuff, put it in its little bed, bend over it and sing, in a crooning kind of way, "Bye, bye, little inkum pinkum poppsy woppsy, put oo ittle heady down, shut oo ittle eyes, go seepy, seepy, garoo, gahoo," and so on and so on.

And then the little one closes its eyes, and goes off, for a while again, to the angels.

Later on, in a brief year or two, when it has learned to lisp a few words, it does not sleep so quietly any more, it has become worldly and cannot return to the angels as at first. Now it usually tosses about in its little bed like a seventeen jointed, wound up, mechanical toy.

I slept like the innocent little babe. A babe in the woods.

I do not know why I awoke the next morning.



"Fight Snakes or Play with Wildcats."

It could only have been the absolute silence about us that caused me to awaken to see what was wrong. In my sleep I must have missed those countless noises which greet the city dweller at break of day and remain with him until he closes his eyes at night. These noises vary with the cities, but Pittsburgh has a better assortment of noises than any other large or small city between the oceans.

First of all come the bells of St. Wakemup's church. They start wrangling and jangling about five o'clock. They keep up their racket for a few minutes and then stop for a few, and then, just when you think they have quit for good they start up again.

This they keep up until the next disturbers of the peace come along—the milkmen.

They carry bells in their wagons, little bells, big bells, bells of iron and bells of brass, bells rung by hand and bells thumped by foot power by means of a crank.

At times there will be three or four of these wagons within the same block, each one trying to outring the other.

After the milkmen have departed, around about nine o'clock the soft-soap man comes along. He carries a bell upon his wagon large enough to adorn a church steeple. He also carries a barrel of soft-soap and an empty barrel for soap fat. For this malodorous article and a little money, he gives soft-soap. His bell is the main object in his wagon. Without it the soft-soap man is lost.

Then comes the man with the china. He carries all kinds of tableware, cups, saucers, plates, bowls, soup dishes, pitchers and a couple dozen other articles.

Then the old rags and iron men show up. Some of them have a string of only one dozen bells; the most of them have more. They all have voices like steam whistles. You can hear their yell of "Oliron, oliron," two miles off. Then there are the men with the ice and the men with the fish: in winter the coal man and in summer the hokeypokey man. They all have their horns to blow.

Then every half hour or so the traveling vegetable market comes along, the leather-lunged, brass-voiced man who goes about with a wagon filled with anything and everything that grows upon or under the earth that is eaten by man. Some of these merchants carry horns, some have bugles, but they all yell like Sioux Indians.

When I first heard their yells I thought they were talking, or rather shouting, some foreign tongue, but by looking at the contents of the wagons I was soon able to understand their cries.

One of them yells "teeto," "teeto," "teeto;" he really has potatoes to sell. Another one shouts "kebg," "kebg," "kebg;" he sells cabbage. Then a third one outsirens the rest with wild cries of "ap-poles," "ap-poles," "poles," "poles," "poles;" he sells apples.

And so it goes on, all day long. In between you hear the rattle and bang of the mills. The booming

of red-hot iron going through the rolls can be heard a mile away. At nighttime you can hear the shrill "whee-yew-eeh," like a long-drawn-out wail as a steam saw cuts through a sheet or bar of steel or iron. This is a very pronounced noise. You can hear it three miles away. You can even follow the saw at its work. There are always a certain number of wails, with a few second's pause between, then a longer pause until a new rail or sheet is placed in position.

Finally you seek your bed and go to sleep. Along about midnight you are awakened by a horrible din. At first you are under the impression that you have been transported to China and are listening to a band concert there, but it is only a hot-waffle man in the street pounding a huge steel triangle with a bar of iron. Then you are proud that you are a free-born American; you are glad that a hot-waffle man can awaken you at midnight, thinking that you might be hungry and want some exquisite hot waffles, six for a nickel.

I missed these various cries in my sleep and awoke, awoke with the pleasing knowledge that it did not matter in the least whether it was early or late. So I turned over lazily and listened to the sounds of the country.

A bird in the bushes beside our tent whistled "Hello," "hello," "ello," "ello," "brrr," "brr," "tschu," "tschu," and from down the river somewhere came the answer: "Ello," "ello," "brrr," "brrr," "teeyou," "teeyou." A pair of doves were

moaning and wailing back in the woods, while almost above our heads I heard a blue jay chattering and scolding a catbird who merely gave a plaintive "meow" for answer.

The "meowing" brought out the crew and cook, who went off into the bushes to find the lost kitten. They did not hunt for any length of time, a splashing, as of a herd of elephants taking a bath, soon told me that they were enjoying a morning swim.

We did not tarry long over our breakfast, nor did we make a very elaborate one. A pot of coffee was soon ready, the navigator purchased some fresh milk, eggs and butter at a farmhouse a short distance off; these, with crackers and a can of roast beef, satisfied all of us.

Then our effects were packed up and placed aboard the Liana and our trip down the river was resumed, on foot and by water.



" DRILLING THROUGH WATER FIRST "

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SLICE IV.

*We hear the wail of a Kinglet—Franklin and its oil
—The humors of rowing.*

AFTER tramping along leisurely for about three hours, during which time we covered some six miles, my Partner became weary and said to me, half in jest, half in earnest:

“Say, Anthony, this boat excursion on foot is not what it’s cracked up to be, there’s a hook in it, as the king said, and I’ve found the hook, I’m tired.”

The king referred to was his royal highness, Nibbs the Thirteenth of Balkanaria, a duodecimo state back there in the rear of Europe.

I heard the expression about a hook being concealed in various places while on a scientific expedition to that country.

While there I passed several weeks at the capital and met the king quite frequently. One evening, while enjoying an after-dinner chat and smoke with him, he used the expression referred to.

We had spoken about trotting horses, Pittsburgh tobies, Angora cats, Etruscan vases and a lot of other things, when the talk drifted back to the old Roman emperors.

Then Nibbs said: "This thing of ruling nowadays has a hook in it, it's not as it in ancient times was. Then it was all bait and no hook, now it is so that the bait to cover the hook hardly reaches out. A king then was a king. What he said, it went. If he saw anything that to him was a pleasure, or a profit, from a pug dog to a castle, was it not immediately for the crown appropriated? Or confiscated for the government? Call it what you like, the king wanted it, and the king got it.

"Only last week my Lord High Chancellor of the Leather Sofa was reading to me already again out of the chronicles of my illustrious ancestor, Nibbs the Ninth. One thing he read brought tears to my eyes and made me to wish to live back again three hundred years."

"What he read was as follows, about:

"Nibbs the Ninth was one day riding the highway near to his castle of Geierstein with his retainers, when a train of pack wagons came to them. At the head of the train there rode the greatly rich merchant, Levy.

"My ancestor condescended to speak a few words with Levy, for he was of a disposition so jolly and friendly to all.

"After some few remarks that were of such trivialness, my ancestor said to Levy:

"'Ah, Levy, just now that I to think of it come, I was told even by my friends that you are a great athlete and mimic; that it is for you a pleasure to whistle and warble even as many birds. Now it is

a great pleasure for us in waiting, if you will into yonder high tree climb and sing like a crow.'

"'But, Your Highness,' stammered Levy, 'I cannot; it is impossible; it——'

"'What,' roared like a lion my ancestor. 'Would you on the words of my friends cast a doubt? They say you can, and it is that you can. Up into the tree, or by the bones of my ancestors I'll have you to feed unto my dogs.'

"And then, of course, Levy climbed up, flapped his arms even like wings and cried 'caw, caw, caw.'

"'Ah! see there, see there,' said the king, and clapped together his hands and laughed. 'See there, my dear head archer, what a strange bird that is up in yonder tree? Bring him down once with your cross bow!'

"And when the bowman brought the bird down, with a bolt of good iron in his ribs, the king shook his head in astonishment and said:

"'Sorcery, sorcery! A minute ago I saw a strange bird up in the tree and now it looks just like Levy. How dared he so to jest with me? How dared he take the form of a bird of omen so evil?'

"As Levy was dead, and the pack train thus without an owner, my ancestor had it driven up to his castle. As no claimants came for it, it belonged even to the kind.

"Oh, me! those were the days when it paid to be a king. It is a difference from now.

"Last fall I got so worked up over the whole business that I even desired to sell out to a rich

American who passes the summer every year here. I offered to sell him my whole kingdom, crown, throne, army and all. At first he pleased me by talking even as if to take it, but he at last did say no; said he could make more money in America; have more fun and much more power. 'Have more fun,' indeed. Do you think we rule for the fun of it?

"We are not kings because we selected of ourselves the honor. We have in the matter no choice. We are born to the purple. We, sons of kings, cannot do anything else. When to us comes the time we must put our crowns upon our heads, take the scepter in our right hand, sit down on our throne and rule. And we must of the day make a whole one, too.

"Years ago it was fun, but now it ain't no more, and you Americans are to give us the most pain the right ones.

"You see one of our subjects leaves here and off to America he goes. And in a few months he sends over his photograph and you don't know him again already as a regular swell.

"Just for an example, once, there was Carl Huzzelmeier, one of my best subjects. When I needed a little extra money in a hurry I just sent my tax collector around already to Carl and of him did collect some taxes in advance. Oh, he was for me a little bank. And then he goes to America, and now he is called Clarence Hazelmere and is a greater swell than any one in my kingdom, and so

pretty is he grown as a stuffed humming bird under a glass globe.

“Or he joins a Saengerbund or a Liedertafel or a Schuetzenverein, or he joins the uniformed



“Carl Huzzelmeter becomes Clarence Hazelmere.”

Knights of the Golden Maas Krug and wears a uniform just stiff with gold braid all over with epaulettes. And then he writes long letters home and says that he has been elected Grand Exalted Something or Most Puissant Other, or that he is a Grand



"And Off You Go."

Commanding Knight of the Knights of Saint Goozelum—and sends of himself a photograph.

“And when of that six-dollar man in a forty-dollar uniform my peasants see the picture, they desire to go to America also, quick right off.

“And they do go, even if they sell their family tombstones for a doorstep to get for the passage the money. That it is that kills us off. A ruler without subjects is in a bad way. No subjects, no taxes, and we just can’t live without taxes.

“Fun, indeed! It’s the other fellows who get of the fun all. We rulers don’t. Perhaps you go out to drive one day, along you roll, thinking of affairs of state, or even of nothing at all. And all at once some fellow throws a little ball into your carriage, and before you see his little shell game you have joined your ancestors with a big bang.

“Or they get into your palace in some way or other, dig a little hole in the floor right under your favorite seat, and then of dynamite they put in a stick.

“Comes then a day when you are talking even to some harmless and innocent stranger, like yourself, for instance, then already they touch her off—and off you go, perhaps through the ceiling, or perhaps out of the window.

“And then, again——” But I had enough, I made my best bow and retired as fast as consistent with politeness.

Upon my return home I repeated the conversation

to my Partner. Since then we find the expression that some things have hooks, quite appropriate.

* * *

After resting for an hour or two we took up our line of march again and soon passed Franklin, the home of almost all of the lubricating oil used on the railroads of the United States.

While drilling for oil in 1859 at this place, James Evans struck a flow of oil which differed greatly from the regular product. It was dark green in color and very thick. It was, and is, used as it came from the wells as a lubricant for machinery and railroad cars. At first this oil sold for thirty dollars, now the price has fallen to four dollars per barrel.

It is found only in and near the town of Franklin. From there it goes to every railroad in the Union, Canada and Mexico, as a lubricant for the wheels and as an illuminant in the headlights of the locomotives.

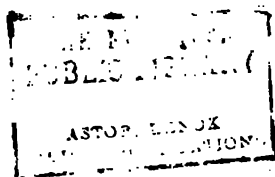
We had dropped Franklin astern a few miles when a nice long stretch of straight river made the crew and cook anxious to try their hands at the oars. As neither of them knew anything about rowing, I thought they might as well learn now as later on. Accordingly, the navigator handed the oars to the cook and the first lesson commenced.

Taking his seat amidships, the cook grasped the oars and started to row. I stood over him for a while and rowed with him, holding my hands over his. After a dozen strokes or so he concluded he

.



"RUSHES OUT WITH MUCH VIOLENCE."



knew all about it; I therefore returned to my seat in the bow and coached. The cook started off very slowly and carefully. His speed was about six strokes to the minute at first. At that speed reach, catch, heave and recover were all right. Becoming emboldened thereby, he increased his speed.

"This is just dandy," cried he; "this is immense; when I go to Corn——"

But just then something happened to his oars. The port oar picked up something like 17 and a half gallons of water and sent it flying aft at the rate of 49 miles a minute, sousing my Partner from head to foot. At the same time the starboard oar blade took a dive down to the bottom of the river. The cook dropped his port oar and straightened out the other one with both hands. In the meantime the Liana had slowly lost headway and had swung around in a half circle. To bring her back into the course again the cook gave a mighty heave with the one oar left. That is, he wanted to. He was somewhat excited, however. On the one side my Partner was using some very energetic language in the stern of the boat; on the other side I was giving him instructions about holding his oars. At the same time the crew and the navigator were howling like wild men.

In swinging his oar back for the stroke, he did not pass it lightly along the surface:

"Not lighter does the swallow skim
Along the smooth lake's level brim."

Not he; he shot it along about one-half submerged and sent a sheet of water a foot wide, two inches thick and about three feet long forward like a stream thrown from a steam fire engine. I stopped the water from going further than the bow of the boat—stopped it with my face at that. I did not intend to do it, but I just chanced to be between it and the wide, wide world beyond. Then my Partner ceased making remarks and I made them, while the crew and the navigator simply made the welkin ring with their howls. We carried a welkin with us, as it was our intention to make it ring at different times. But this last was too much for the cook; from rowing he went to rowing with the crew and navigator.

Rowing—Propelling a boat with oars.

Rowing—A low, vulgar squabble, or fight.

This explanation merely for the benefit of those poor ignorant foreigners who do not understand the beauties of the English language.

Why cannot we write our words so that you can tell at a glance how they should be pronounced?

Take that beautiful little Marmion poem we all of us used to spout at school:

“Saint Mary, mend my fiery mood.

I thought to slay him where he stood,

Old age ne’er cools the Douglas’ blood.”

It really should be written:

"Saint Mary, mend my fiery mood,
I thought to slay him where he stude,
Old age ne'er cools the Douglas' blude."

Or perhaps this way:

"Saint Mary, mend my fiery mud,
I thought to slay him where he stud,
Old age ne'er cools the Douglas' blood."

Or else this way:—but enough, let us get back to our boat.

Peace was only restored when the crew took the oars for his first lesson. The crew profited by the experience of the cook for a little while. Just as he was beginning to feel himself quite an expert oarsman, he made a nice, strong stroke—and missed the water entirely. Both oars raced along in the air like the arms of a windmill in a storm. Then the crew leaned back in his seat and lifted both feet high in the air; he slipped still further, got off his seat entirely and stood on his head. But his feet kept on going backwards until the navigator on the next seat stopped them—stopped them as a board backstop on the diamond stops a swift, missed ball, or, rather two of them.

Luckily the Liana had been built for just such escapades. In the hubub that ensued a lighter boat would have upset. As it was we drifted along in perfect security. The navigator took the oars again and we resumed our journey in good humor all around.

SLICE V.

We catch a large fish and eat chowder.

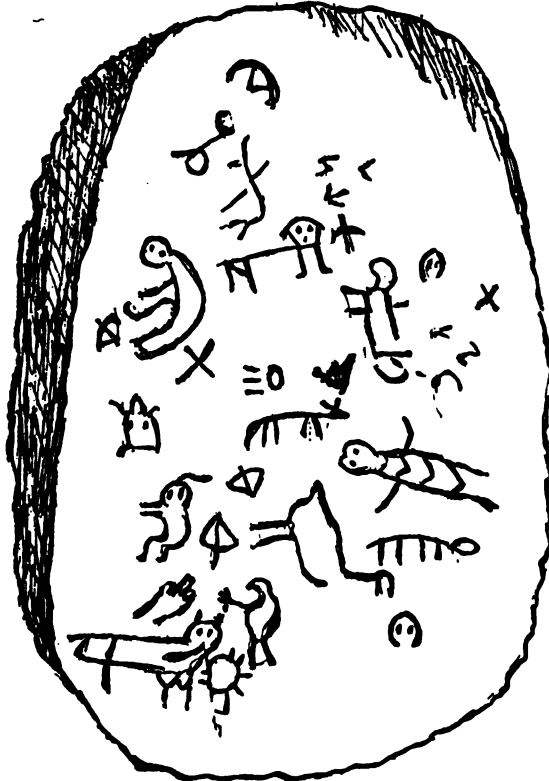
A FEW miles below Franklin we came to one of the historically interesting points on the river, to Indian God Rock.

High hills rise abruptly from the river's edge on both sides of the stream, leaving barely room for the tracks of the railroad on one side; on the other there is no room at all, as the crew said, it's all hill. Indian God Rock is a huge boulder with a smooth side some ten feet square facing the river. This side is covered with rude carvings made by the—well, they say by the Indians, but when or why these petroglyphs were made, no one can tell.

In the summer of 1749 M. Celeron was sent by the Governor of Canada, the Marquis de la Gallisoniere, to take possession of all land along the Allegheny and Ohio rivers for the King of France. Celeron kept exact records of his trip, giving courses, distances traveled, latitude and longitude of the principal points passed with occasional brief notes of the most important occurrences.

In order to leave proof that he had passed from Canada down the river to the Ohio, Celeron buried leaden plates, suitably inscribed, at various points

along the river. In his diary he states that he buried one of his plates under a huge rock, four leagues below the river Aux Boeufs, upon the surface of which many figures are rudely engraved.



"Covered with Rude Carvings."

One of these plates was dug up later by the Indians and sent to Governor George Clinton, of New York. Search has often been made for the plate under Indian God Rock, but in vain,

These rock carvings are found in many places along the Allegheny and Ohio rivers, always in very prominent positions where they would readily be seen by voyagers up and down the stream.

If Indian God Rock had been discovered upon the top of Popocatepetl or serving as a socket for the North Pole, it would have been taken from there and deposited in safety in some museum years ago. As it is it was left where every John Smith and John Brown could carve his illustrious name upon it and thus, in course of time, destroy the original carvings entirely.

We drifted on down some ten miles farther, found a suitable site for our camp and then settled down for a rest of several days.

* * *

Our camp stove is a great success. Before leaving the city we had examined all kinds of stoves, real store stoves, as the cook called them, at the hardware stores, and camping-out ones at the athletic and sporting supply stores. Stoves for oil, alcohol and charcoal, stoves for wood, big and little, Yankee stoves and Dutch stoves.

Finally we had a stove made to order in an old iron scrap yard, simply eight pieces of old gas pipe, each eighteen inches long, half inch diameter. Also two pieces of sheet iron about one foot square each.

To set up our stove was a very simple matter; with a suitable piece of board we scooped a hole in

the ground about a foot deep and wide and two feet long.

In it we built a fire and kept it going until it was almost full of glowing embers, then the bars were placed over the hole and the stove was ready for business, for cooking, frying, roasting or stewing.

If we wish to keep one of the dishes warm for any length of time we simply place one of our iron sheets over the bars at one end of the stove and place the pan or kettle upon it. The whole outfit takes up very little room in packing and the weight is trifling.

The bulkiest part of the whole stove, the hole, we did not carry with us, we got a new one at each camp.

Having described our stove in detail, it is time to tell of the first great occasion upon which we used it. First of all, we decided to take a good day's rest, and then go fishing. It is true that sitting in a boat for a day or two might be called resting, but then you get tired of resting in that way and want a change.

While resting we hunted bait. As none of us knew much about fishing and bait we decided to try everything in the bait line that we could find, consequently we collected quite a store of minnows, grasshoppers, crabs, worms and a lot of other things that swim, hop, crawl, creep and fly in, on and under the earth and water. We did not bother with Brown Hackles, or Parmachene Belles, or a Scarlet Ibis—although these are highly recommended in the fisheries course of the Interstate Cor-

respondence School. We contented ourselves with a dingbatted worm or a swatted grasshopper. You may not know what a swatted grasshopper is, but neither would you recognize a Parmachene Belle if you saw one, so why worry about it?

Then we debated how to fish.

An outline was suggested as the simplest and surest way. This is simply a long, heavy line stretched out into the river from the shore. To this main line a great number of small lines, with two or three hooks each, are fastened.

The hooks are baited and the line is left out over night. If any roving fishes are out making a night of it and desire a bite, they can get it while going down the line.

This method was frowned down as unsportsmanlike. Finally we decided the matter each in his own way.

I sat down under a shady tree, took a book, lit my pipe, threw my line in, tied the end to a rock—and forgot all about it. My Partner opened a book without throwing in a line or lighting a pipe. The other three went out in the boat and fished according to their idea.

They would hitch a minnow or grasshopper or some other wriggling thing to their hook, throw it astern and then row upstream slowly. They had taken a few little fishes in this way and were highly elated at their success when the crew gave a yell that caused the two of us on shore to drop hook, book and all in our haste to see what was up. The crew shouted that they had caught a whale or a



“BREAKERS IN SIGHT.” RIVER VIEW AT RYMERTON.

muscallonge or some other large fish. After considerable maneuvering they got their catch aboard and then hurried ashore as fast as the oars would take them.

Then they brought us their prize for inspection. After we had all looked at him to our heart's content the question arose as to his family name. The cook called it a carp, the navigator said it was a jack salmon, the crew thought it might be a halibut or a cod.

Then they asked me.

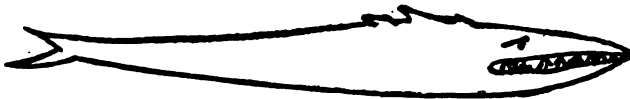
Now I know just as much about fishes and fishing as I do of spiral staircase building, but it would never do to let that crowd hear it.

It was a peculiar kind of a fish, it didn't look just the way a regulation fish ought to look. The crew looked at it for a while, then he took a stick and drew two long curves, two short ones, a dot and a dash in the sand, and said :



"How a Fish Ought to Look."

"There, that's how a fish ought to look, but that thing doesn't look like that, that looks like this."



"That Looks Like This."

We all admitted that our catch did look somewhat out of the ordinary, he was long and thin and had a mouth as full of teeth as a buzz-saw. His eyes were placed away up near the top of his head, eyes that even in the death struggle seemed to say, "Watch me get at him, watch me bite a hole in him."

If the thing had had four legs, or even three, I would have called it a razor-back hog that had taken to the river for a change. As it was I looked at it for a minute or two, took it in my hands and hefted it, opened its jaws and felt its teeth. Finally I noted the shape of its tail and counted its fins.

Then I put on my lecture-room mien and said:

"This is the great American sweet water finfish, the *piscus finicus Americanus* of the naturalists, and a splendid specimen indeed."

Then my Partner looked at me and felt proud of me, the look told me that.

The navigator also looked at me, but at the same time he opened and closed his left eye very slowly two separate times.

But the cook said:

"Now, Professor, please don't forget what Izaak Walton said: 'De mortuis nil nisi bonum,' by which he meant in English that you should see only the good points of your dead fish, don't call the poor fellow hard names.

"*Piscus* or *finicus*, what's the odds? just so long as he's our cuss, into the kettle he goes. I'm cook of this expedition and I sing with Meredith every time:

“ ‘We may live without poetry, music or art,
We may live without friends,
We may live without heart,
We may live without wealth,
We may live without books,
But civilized man cannot live without cooks.’

“Hand him over and I’ll fix him.” Then came the question of how to prepare the fish. The crew wanted to fry him, my Partner wanted to boil him and serve him up with boiled potatoes and butter sauce, and have him coiled up on the dish with his tail in his mouth and little sprigs of parsley down his back, but the cook said he would make chowder out of him; that ended the discussion.

“Come on ‘gator,” said he, “let’s go a-gunning for the etsees while the others get the other things ready.”

Thereupon the two of them got the ammunition and went off inland while the rest of us started the preliminary work.

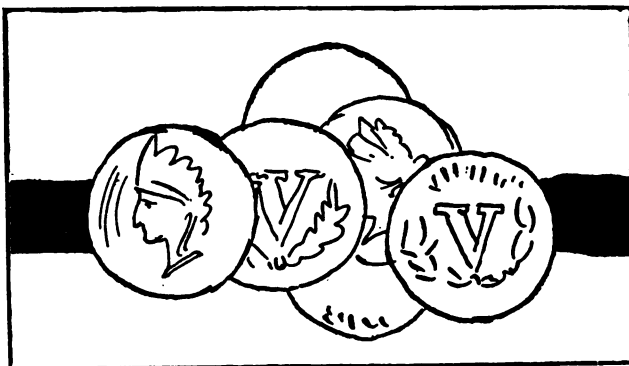
We sliced up about a half pound of salt pork and then chopped it into little bits the size of a kernel of corn. A piece of board, picked up on the shore, and polished with a handful of sand, gave us an excellent chopping block.

The finely chopped pork we put into a kettle of boiling water and then added six finely chopped potatoes. While we were cleaning the fish the hunters returned from the chase. They had fired a charge of four nickels at a farmer’s wife and had bagged some onions, tomatoes, carrots and a little head of

cabbage. Of these we took an onion, six carrots, six tomatoes and half of the cabbage, minced them all finely and put them in the kettle. Furthermore we added salt and pepper and after two hours' boiling we added six finely crushed crackers.

"By the way," said my Partner, "why do you call the vegetables etsees? That's a new name for them."

"Oh," answered the cook, "that's old. You see it was this way. A school board out in the country



"Got the Ammunition."

somewhere was once paying its annual visit of inspection to the school and was asking the pupils all kinds of fool questions that they had prepared in advance. One of the members noticed a little boy who help up his hand at every question. Finally he turned his attention to the little fellow and said:

"What is the chief crop grown in Minnesota?"

"Etsee," answered the boy.

"What do they mine in Pennsylvania?"

“‘Etsee,’ answered the boy.

“‘What do we, ah, um, ah, import from China?’

“‘Etsee,’ promptly answered the boy.

“‘Good,’ said the visitor, ‘bring up your book and let me see it.’

“Smilingly, the little fellow produced his book. ‘Here it is, sir, etc., after each question.’”

After two hours’ cooking, the bacon, the fish, the etsees and all had blended to one—but who can put down in cold black ink how a perfect fish chowder tastes out in the woods?

* * *

The past two days had been bucolic ones; we toiled not neither did we spin. We found an ideal camp site a few miles from Foxburg and settled down to take things easy, at least my Partner and I did. The other three were not so quiet. They had a new idea every hour or so. Once they dug up half an acre of ground looking for Indian relics. It is hardly necessary to state that their search was in vain. That did not worry them in the least, however. “If we can’t find things,” said the cook, “we can at least see to it that some one else may have better luck.”

“Let’s go to work and manufacture something or other and bury it.”

First they decided to get a lot of birch bark and draw pictures upon it.

“Good,” said the cook, “I can draw a pig in three different positions.”

“Pig nothing,” said the crew. “We want to do this thing up right and put down something that

will be at least five hundred years old, and at that time there wasn't a pig in all America."

"Oh, there wasn't, wasn't there?" jeered the cook.

"No," answered the crew, "there wasn't, and for that matter there wasn't a chicken, nor a goat, nor a cow, nor a horse, nor a Dago, nor a Hunky, nor a Pilgrim Father, nor, nor—any of us here. We all came over from Europe later on."

"Well, then, let's invent something that might have been here at that time," replied the cook.

They finally got some clay from the river bank, kneaded it into a stiff dough and formed little tablets about a foot square and an inch thick out of it. Then they proceeded to cut all kinds of devices into the clay with a pointed stick, following the advice the navigator gave them.

"You see," said he, "Columbus discovered America in 1492; but who was here before that time? We know that the Norsemen went to Iceland, to Greenland and to the New England coast centuries before Columbus' time. Now, why not send some adventure-seeking Viking up the St. Lawrence, through the lakes and then down the river here the way we are going."

Then they put on their thinking caps to devise appropriate designs for their tablets.

The crew filled out his tablet with a waterfall nine inches high, at the base of the fall he had some men about a quarter of an inch tall standing beside a boat.

"There," said he, "I've brought my old Yon Yonson as far as Niagara. How he got up through the

rapids is his lookout. You fellows work backwards from there."

"That's easy," said the navigator. "From there to Norway there's nothing that would seem out of the ordinary to a Viking, we'll simply have to draw fights and boats."

Then they filled out half a dozen more tablets with warriors and fights and old Viking boats and set them aside to dry.

After breakfast the next morning they covered them with charcoal dust and placed them in the emptied stove hole and piled the glowing coals on top. By dinner-time the tablets were burnt hard as bricks.

Then they dug a deep hole, placed a large, flat stone in the bottom of it and put the tablets in, one after the other, with a layer of grass between each two. Flat stones lined the sides of the hole, another one served as cover. Finally they filled up the hole with earth and made my Partner and me help roll a huge boulder on top of Yon Yonson's library, as they called it.

"There," said the cook, "some day some one will find the lot and then there will be a guessing match for fair."

"After supper," said my Partner, "I will tell you the story of your old Norseman who camped here five hundred years ago."

And so when evening came we selected comfortable resting places and prepared to listen to my Partner's story.



SLICE VI.

We are told a love story, which isn't much of a love story after all.

At the time our hero lived, the Scandinavians ruled the seas. From their northern harbors their war vessels visited England and all other countries along the Atlantic Ocean and the Mediterranean where booty was to be taken.

In their drekis, or dragon ships, so called because they were ornamented at bow and stern with carved dragons' heads, with crews often numbering five and six hundred men, these sea rovers sailed north

and south. They were equally at home among the ice floes of the Arctic or under the palm trees along the Nile.

They became such a plague and menace to the French that King Charles the Simple, in sheer desperation, in an effort to obtain peace, gave them the province now called Normandy. The plan was successful; the wild and lawless Norsemen became among the bravest knights of France. Their leader, the Duke of Normandy, with a large army, later invaded England, conquered the English at the battle of Hastings, and was finally, as King William the Conqueror, crowned in Westminster Abbey on Christmas Day in the year 1066.

Among the boldest of all Vikings at that time was Hjalmar, son of Ragnar. With his warship, the Eagle of the Sea, he had made successful cruises to France and into the Mediterranean. Spoils from Rome, Greece and Egypt adorned his home in Scandinavia. When he had barely passed his majority, however, his vessel was attacked by an overwhelming force; he was captured and taken a prisoner to France, where, among the Normans, he was not entirely a stranger in a strange land.

He became, seemingly, resigned to his fate, and, in a few years, owing to his great prowess and skill with sword and spear, became Captain of the Guards of the Duke of Ormeux.

But at heart Hjalmar was not contented; although honored and feared by friend and foe, he always longed for the wings of his Eagle of the Sea,

so that he could once again sail the seas his own master.

And then Iseoult came; Iseoult, the Duke's cousin.

Seated in the castle court one day, idly leaning on the hilt of his sword, far, far away in spirit; he did not hear light footsteps approach and was startled when a low voice said to him:

"And what ails our Captain of the Guards? Does he dream of a maiden fair, far in the north?"

Rising abruptly and turning, Hjalmar faced Iseoult.

"I dreamed, fair lady, of a truth, but the maiden fair was not of the north."

"Why, now! brave Captain, has one of our southern damsels stormed your heart?"

"Fair lady," answered Hjalmar, looking boldly into Iseoult's eyes, "she is indeed of the south."

For a few brief seconds Iseoult met his gaze, then slowly lowered her eyes to the ground, while a faint red crept into her cheeks.

"But a truce to this idle talk," said she. "I would have a few earnest words with you. Troubadours sing a song of your feats of arms; how, unaided and alone, you conquered my Lord des Brassos and his three retainers, how you——"

"Fortune favored me, fair lady," interrupted Hjalmar.

"Brave men," answered she, "make fortune favor them. I would seek the aid of your arm."

Again her eyes sought his for a few brief seconds;

again her gaze dropped to the ground and again a faint red crept into her cheeks.

And Hjalmar's heart beat with joy, for he knew by this token that she was not averse to him, and all the man in him sang exultantly under the knowledge.

"What my sword and spear can do for you, fair lady," answered he, "they shall do. You have but to command."

"Nay! it cannot be a command, it is a request."

"They are alike to me," replied he.

"But I shall request much!"

"Fair lady," answered Hjalmar, "in my home in far Norseland the skalds sang a saga of one of my ancestors who was asked a similar question. They sang:

"I kneel before you,
Slave faithful and true,
Thou fairest of earth's fairest daughters,
For you I will fight,
Be it wrong, be it right,
Where e'er my ship floats on the waters."

"Be it on land or be it on sea, set me my task."
With that Hjalmar half knelt before her and bowed his head so low that his long, tawny hair, yellow as the ripened grain, fell down over his shoulders. And his was a face that could stand such a framing.

Iseoult shook her head, like a pert bird, so that her hair in turn fluttered loosely in the air. Black it was, and glossy as polished ebony.

Bending her head to one side she looked at Hjalmar with sparkling eyes and said:

"And I ask you to abduct me."

Like a taut strung bow when the cord is cut, Hjalmar straightened up. A flash of great joy spread over his face, seen by Iseoult, even if it was but for a fleeting second.

Then Hjalmar answered in the cold, measured tones of the Captain of the Guard:

"You would but jest with me, Madam!"

Iseoult frowned, but it seemed as if the frown were forced.

"How, now, Sir Captain, were it such a grievous task I set you?"

"And then!" answered Hjalmar, ignoring her remark, and looking deep into her eyes. "And then?"

But Iseoult tapped her foot lightly upon the ground and looked at the swallows circling about the castle towers, as if she had not heard his remark.

"My kinsman, the Duke," said she, finally, "has promised my hand in marriage to the Count Carsavonne, and I will none of him, so I would e'en be abducted by you before he comes and taken to, to, taken to——"

"Madam," said Hjalmar, gravely, "you shall be taken to——"

"But I said not where," replied she.

"It matters not," said Hjalmar.

"Oh, yes," said she, presently, "you shall take me to my kinswoman's castle on the coast, to La

Tourenne Sur Mer, to the widowed Countess de Bonnefois."

"But if she refuses aid?" said Hjalmar.

"Then we will fare farther," answered she. "Here the Count shall not find me.

"This day week we ride, so fail me not."

Now, when the time came Hjalmar ordered out one score of men, and they were all from captive Norsemen who had entered his company from time to time. Not in the night did they set forth, but boldly at break of day, as if to ride far afield to meet the Count.

And Iseoult, with her maids, rode with them.

They rode afield as if to meet the oncoming suitor, but there where the road bends to the right, at the forest of Villeneuve, to the lands of the Count Carsavonne, Hjalmar swerved his troop sharply to the left and took the road that led to the sea.

With but a brief halt at noon, more for the sake of the horses than for themselves, the troop moved swiftly onward, hour after hour; then, just as the last rays of the setting sun touched the tops of its towers, the castle of La Tourenne came in sight.

High on the summit of a crag it stood, looking down upon the small village below like some huge bird of prey. From a distance it was exceedingly hard to tell where the work of human hands on the castle began and that of nature on the cliff ended.

The castle at first glance seemed to be but a square hewn, turretted continuation of the cliff itself.

The path up to it was so narrow that but two riders could go abreast; in and out it wound, but ever upward.

Loud horn signals from one of the towers showed that their coming had been observed. Thereupon Hjalmar sent two men-at-arms ahead to announce the arrival of the Countess Iseoult, who was finally made heartily welcome by her kinswoman.

"And so he of Carsavonne would wed you," said the Countess, after Iseoult had told her story, "and you will not? Then, while you tarry here in my castle, he can woo and wed as he likes, but not within these castle walls.

"Ho, Sir Hjalmar, see to our defenses; I count them perfect. Your eye may, however, find some weak point."

When Hjalmar reached the flat roof of the castle on his round, he saw that the place could not be attacked from the sea side. There the cliff rose straight and smooth almost as the castle walls. But one way of scaling the face of the cliff there was, and it he saw only after it had been pointed out to him.

Here and there an iron spike projected from the face of the cliff; again, at other points, small ledges had been cleared to a few hand breadth's width; at another place a few dangling links of a chain hung over a projection. By the aid of these the fishermen at times scaled the cliff when they would save the long way around the hill.

Viewing the valley from the castle roof the next

day, Hjalmar suddenly pointed down to the edge of the forest and smiled grimly as he said :

"There come unasked visitors."

Then presently they saw sunlight glint on polished armor and head piece, while dancing points of light marked the spear heads of riders. It was Count Carsavonne and his troop. Too late, too late, by a day.

The troop came on slowly and halted at the base of the hill, then there came up to the ears of the castle folk the loud notes of a trumpet, a rider detached himself from the cavalcade and rode alone up the hill ; from his lance point fluttered a small white flag.

At the castle gate he halted and delivered his message. It was brief. The Countess Iseoult must return to her home immediately, and Hjalmar must be delivered up a prisoner.

Ha, you should have seen the Bonnefois' face as the message was delivered to her ! Her words were not many in reply ; what they lacked in length they made up in strength. I doubt whether the envoy on his return delivered them as they were given to him.

And then the siege began.

Hjalmar had been placed in charge of the defenses ; with most of his men he now stood upon the castle roof where, with many a laugh and jest, they waited the oncoming troop.

On the level roof Hjalmar had erected a massive wooden trough, some twenty paces in length ; it was of a man's height at one end, the other rested low

upon the roof's stone copping. And this end pointed down upon the road leading to the castle gate.

Huge stones, ground round by long years' rolling in the surf, had been collected and carried to the roof.

And then when the besiegers reached a broad, clear space in the road, half way up the hill Hjalmar gave a signal, a huge round boulder was lifted by two men and thrown down the trough. Slowly it sped at first; then faster and faster as it rolled down the incline, until finally it flew far out beyond the castle walls. Outward and downward it sped until it struck the solid rock road a dozen paces or so above the besiegers.

Barely had they seen it strike before they heard the crash of its fragments upon shield and armor and then saw the troop spring into the woods at the side of the road.

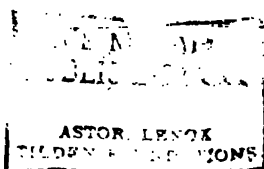
But not all; three forms moved not, they lay motionless in the road.

A second time the troop collected and started up the hill. This time Hjalmar allowed them to come within a hundred paces almost of the castle walls, then a full dozen boulders were loosed in rapid succession down the trough, large and small. Some bounded far beyond the enemy, others fell too short, but two of the largest fell full fair in the midst of the party, wedged close together in the narrow road.

This was too much for Carsavonne's men-at-arms, for a few moments they fluttered about like a disturbed swarm of wasps, and then, despite the com-



CASTING PLATE GLASS.



mands of their leader, they turned about and fled in wild disorder.

"Now, by our Lady," said Iseoult, gleefully, "I had not thought a siege so easily made to naught. They'll come no more a-visiting here."

"But, yes, Madam," said Hjalmar, shaking his head and laughing, "they will not come a-visiting again by day, to that I agree. But to-night, when we cannot see when or where to drop our missiles from the heavens, they will surely come. But we will not await their coming, we will go to meet them. They think only of an attack upon us, and, because they outnumber us four to one, dream not that we will attack them."

Then he bade his men remove their heavy armor, lest clank of metal upon metal betray them later. Taking only their swords and battle-axes, they scaled the face of the cliff to the beach below and took their way slowly and noiselessly to the camp of the enemy.

Near it they halted and, when night fell, Hjalmar alone went forward to listen to the talk of the camp.

Deeming no foe nearer than the men in the castle, no guards had been placed about the camp. Hjalmar could thus get near enough to hear much of what was spoken.

To his joy he heard that a large number of the men had been sent up into the forest near the castle to collect brush and fallen timber. With these

they intended to fire the castle gates when night had fallen.

Shortly after midnight the troop broke camp and started up the hill to the castle, leaving part of the force behind to guard the horses and camp effects.

As they toiled slowly up the steep and narrow path Hjalmar and his men silently fell in behind them. Up they went and noted not, in the dark, that their numbers steadily increased as one by one Hjalmar's men joined their ranks, first among them being Hjalmar, who pressed forward slowly until he came to walk at the head of the troop beside Count Carsavonne himself.

This was easily done, the night was dark, all talking forbidden and each one of the party was listening so intently for sounds that might have told of the presence of an enemy in the woods, that they noted not what was going on in their ranks.

Up they went until a broad level space in the road was reached where there was enough light to distinguish friend from foe.

Here Hjalmar halted and shouted his battle cry, and before the astounded Carsavonne men could all draw their weapons the Norsemen were at them.

Bravely they fought, but step by step they were forced backwards down the hill.

One by one they fell until Carsavonne saw the uselessness of sacrificing more of his men. Stepping backwards and lowering his sword point, he cried out loudly: "A truce! A truce!" Thereupon Hjalmar answered in Norse to his men.

Slowly the combat ceased and the silence of the night returned, broken only by the labored breathing of the combatants, and, at times, by a half-stifled groan, or louder curse from one of the wounded.

Stepping forward to Hjalmar, Carsavonne saluted with his sword.

"Brave Norseman," said he, "when I rode out of the castle of des Ormeux, I pursued, so I thought, but a fair-faced swaggerer from the North who had cast a spell upon fair Iseult and fled with her, at my approach, to hide behind the petticoats of my lady of Bonnefois, but, by Saint Denis, greatly did I err. Seldom have I met greater skill and daring than thine."

"Let us have peace till the coming day, then let us battle, man to man, with sword, battle-axe and dagger to the death. If you conquer, then my men shall return in peace to Carsavonne and there shall be no feud between the house of des Ormeux and thine."

"Noble Count," said Hjalmar, "I have met in battle knights from many lands but none more courteous than you. I will abide by my mistress' commands."

"Peace be between us until then," replied the Count. Recalling his men with loud horn signals he returned to his camp, while Hjalmar ascended to the castle.

"How, now?" said Iseult, stamping her foot impatiently upon the floor as she heard Hjalmar's re-

port. "You had them at your mercy and ceased battle upon a few fair words from Carsavonne. Of a truth you seek refuge, seemingly, as he said."

But Hjalmar answered calmly:

"Fair lady, my sword is at your service, my life is yours, but my honor is mine. To the Count's fair words I could but act as I did."

"Then meet him at dawn, meet him with sword and axe, and, and—bring back my token," said she, gazing for an instant with wondrous tender eyes at him. "Bring back my token—Hjalmar."

With that she stripped a silken bow from her hair, handed it to him and—fled from the hall.

And soon the tops of the castle towers gleamed in the rising sun, then the trees on the hill sides gradually emerged from the white mist-clouds drifting up from the valley. The sky, far over the hills, where it touched the earth, seemingly, became a faint red pink that grew deeper and deeper from moment to moment. From the village below came sounds of awakening life, lowing of kine and barking of the village dogs. Day had come.

Then Hjalmar, with two of his followers, went down the hill to meet the Count in battle.

There where they had battled the night before, they met. Gravely and courteously they saluted and then scanned one another eagerly. Fully two inches taller than Hjalmar was the Count, and of greater width across the shoulders. His close-fitting armor made him look even more massive than he really was.

"'Twill be the fight of our big white bear of the north," said Hjalmar to his companions, "and the swift-stepping wolf."

Then the fight began. Gently and cautiously, at first, the swords met, as each combatant measured the other's skill and strength of arm. Then gradually the strokes fell faster and faster. Twice the Count's sword fell, and not lightly at that, upon Hjalmar's helmet. Round and round they circled; then a small red spot showed on the Count's shoulder; slowly it spread and crept down his arm, until the bright red drops fell to the ground out of his gauntleted right hand.

Watching this, Hjalmar was taken partly off his guard for a brief second, swiftly the Count's sword descended upon his helmet, denting its heavy steel as if it were a child's plaything. Staggered by the blow Hjalmar sank to one knee and partly lowered his sword. With a half-suppressed cry of exultation the Count bent forward and raised his sword for one mighty, final blow upon the crouching form. But Hjalmar turned swiftly, straightened (with the spring of the wolf at the bear's throat) and struck with a swift, swinging upward blow. Squarely it struck the uplifted arm at the bent elbow, throwing it upwards and backwards. Then, before Carsavonne could recover himself, the downward swing of Hjalmar's sword caught him a crashing blow where helmet joined shoulder-piece.

Reeling backwards, the Count flung his arm wildly in the air, his shattered muscles loosed their

grip upon the sword and it flew in a wide circle over the side of the road to the depths below.

Stepping backwards a pace, Hjalmar folded his arms and waited until Carsavonne recovered. Then saluting with his sword, he said:

"Noble Count, shall we continue with battle-axe or dagger?"

Grasping his dagger the Count half raised his arm only to let it fall again with a muttered imprecation. Dropping it to the ground he raised his visor and extended his hand to Hjalmar.

"If I had been defeated by a trick of fence," said he, "I would fight on, but 'twas superior skill that won. I yield and crave peace. And now to the castle to tell the outcome of the battle."

In vain Hjalmar protested, deeming it a humiliation for the Count.

"Nay, nay," said he, "we go not up as conqueror and conquered; we go as friends."

"I am but Captain of the Guards, here in France," said Hjalmar. "I cannot aspire so high to claim the friendship of the noble Count of Carsavonne."

"My rank as such gives me great powers," replied the Count. "Kneel before me." Then he placed his sword lightly upon Hjalmar's shoulder. "As Norseman Hjalmar you knelt, rise as Sir Aylmar, Knight of Normandy."

"Now let us to the castle as friends."

* * *

"That," said my Partner, rising, "is the story of Hjalmar, the Norseman."

"Well, hold on," cried the cook, "when's he coming over to America? When's he going to bury his tablets?"

"My dear," said my Partner, "don't you see that he married Iseoult, and do you think she would let him go gallivanting all over the world? or to come here just to bury tablets for you three? I really wanted to bring him over, truly and honestly, but don't you see how he cut out another career for himself?"

"But this I can tell you: his descendants came to America in later years and became Americans; one of them is living yet, but the name was changed a third time. First it was Hjalmar, the Norseman; then Sir Aylmar, the Norman; then the name and fame of the family went down hill gradually, and now we find the descendant of the Viking and the Norman Knight as plain Elmer Norman, out in Squeedunk or Punxsutawney, hauling coal for a living."

SLICE VII.

We run into a "squall" and listen to some interesting history.

THE many short bends and curves made by the river among the hills made our trip very interesting; a change of scenery is produced every ten minutes or so.

Once we passed around six separate and distinct curves in the course of an hour, and we were not rowing particularly fast at that. Usually there would be a riffle at each curve; there the river would make quite a noise as it tumbled over the rocky bottom, and the shallower it was the more noise it made.

When nearing a curve my Partner would cry out: "Curves ahead! Breakers in sight!"

Then I would turn about and take a look. If the channel was narrow, and the waves splashed up high, I usually took it for granted that the water was deep enough to carry us through without any trouble. If, however, the channel was wide, and the waves were only little, lappy things a few inches high, then I knew that the boat channel proper was narrow; in that case I would give the course. In

going through a ruffle my Partner would issue commands something like the following:

"Steady on your oars, men, here's the ruffle."

"Two strokes on your left oar."

"Three strokes with both oars."

"One stroke with your right oar; no, I mean 'my' right, 'your' left."

"There's a big wave. Look out! over we go! My! but that was nice!"

"A big rock ahead! Pull on your right oar; pull, pull! No, I mean your left oar. Oh, my! it was no rock at all; only a big wave."

"There, we're through it! Didn't we go fast? We must have gone at least a mile."

And the funny part of it all was that the particular oarsman at that time paid no attention whatever to the commands, but rowed straight ahead with the current.

These bends made the trip interesting. We never knew what kind of a picture would be unrolled within the next few minutes; usually we ran into a new series of hills. In many places we seemed to be rowing upon some small lake locked in among high hills—hills rising so abruptly from the water's edge and so jumbled together that there seemed to be no outlet for the river.

Once, while tarrying for a day in one of these inclosed stretches, the triumvirate decided to have a sail. A suitable pole for a mast was soon obtained in the woods; a reserve tent flap was pressed into service as a sail. Then they started out.

A few yards from shore a lazy little bit of a wind espied the sail, gave a little gasp of joy and made a dash for it, struck it fairly in the middle and rushed the boat out into midstream. Then it whirled the boat about a little, got tired out of the sport and resumed its voyage upstream. A few seconds later it struck the side of the hills at the curve above and was turned down stream again.

In passing it struck the sail a second time, turning the boat about in a complete circle before it left it. Then it struck the hills on the south-southeast shore and became excited to such an extent that it forgot the way into the bend entirely and raced about in the curve for half an hour, howling and carrying on like a real live thing. Now and then it would strike the sail from three different directions at one and the same time. Then the boat would try to dance a quadrille all by itself. She would keel over and water would dash over her starboard binnacle and port keelson at the same time.

And the navigator would yell orders at the crew and cook, and the cook would shout out commands at the navigator and crew, and the crew would call on us to come and help.

And my Partner would order them in shore immediately and bemoan the day the poor lambkins were allowed out in a sailboat, and act, in fact, just like a hen with young ducks.

Finally the wind took a fresh swoop down from the hill on the north-northwest shore, caught the sail, wrapped it around the mast and tied it there

with a diamond-hitch, gave a final hurrah and then scurried up high into the air and dropped over the top of the hill into the next curve above.

The navigator made extended studies upon the subject and finally discovered that the wind usually went up and down stream in that way. It simply whirled about in the bends until it attained proper headway, then it took a header over the hill and repeated the performance ad infinitum. When an up-river wind meets a down-coming one, the weaker one must finally give in and take the direction of the other.

If I had the time I would like to build a canoe with the proper adjustment of horizontal and perpendicular sails, movable on hinges. With such an outfit the water and the wind both could be used to navigate on the water, or in the air, up there. This is a very promising field for future investigation.

* * *

Life along the Allegheny River was not always the quiet, lazy one we are now leading. One hundred and twenty-five years ago or thereabouts, the smoke of our campfire might have drawn the tomahawk and scalping-knife to our tents.

The valley at that time, along almost its entire length, was entirely at the mercy of roving bands of Indians. They would come down the river in their light canoes, strike a deadly blow at some small settlement or isolated cabin, and be far away, up the river again, long before the scattered settlers could organize pursuing parties. In the summer of 1779

these raids were so numerous and death-bringing, that the greater part of Westmoreland County was depopulated.

Colonel Brodhead had, at that time, about 800 men in his command at Fort Pitt, now Pittsburgh; at Fort Hand, on the Allegheny, thirty miles above Pittsburgh, and at Fort Crawford, about fifteen miles farther up.

On the 26th of April a band of one hundred Indians attacked Fort Hand. The seventeen men comprising the garrison resisted successfully all attempts of the Indians to capture the place. All day long a brisk gun fire was exchanged between the two parties. When night came the Indians set fire to a large stable near the fort, intending to fire the fort through it. Luckily, the wind blew the flames away from the fort.

At night one of the defenders escaped from the fort and hastened to Fort Pitt for aid. By the time this came—the next day—the Indians had given up the attack and retreated up the river. Several miles above the fort a small party of Indians, a few days later, attacked a small settlement a few miles back from the river. There they killed a settler's wife and four children and carried two other children off into captivity.

When the news of this fresh outrage came to Fort Pitt a party of scouts, under Lieutenant Brady, was immediately sent out to follow up and punish the Indians. Brady—after whom the town of Brady's Bend is named—had every incentive to

hunt down the Indians. A year before they had killed his father, and just a few weeks before leaving Fort Pitt on this expedition he had received news of the death of his brother at their hands.

Brady headed a party of twenty scouts, all attired in Indian costume, and started up the river. At the point now called Brady's Bend they found the Indians' canoe hidden in the bushes on the river bank. The trail of the Indians was followed a short distance up what is now called Red Bank Creek, and their camp located. Brady and a Delaware chief, called Na-Now-Land, went forward together to make a close investigation of the camp. They succeeded in approaching within a few feet of the Indians and saw that there were only seven of them. The two little captives sat at the fire, seemingly unharmed.

While watching the Indians, one of them arose and walked around the camp to see if foes were near or not. In so doing he nearly trod upon Brady, but luckily did not see him. As everything was seemingly quiet, the Indian returned to the fire, exchanged a few words with the other Indians and then they all wrapped themselves in their blankets, lay down about the fire and went to sleep.

Brady and the Delaware then returned to their party; a short time after they all went forward and surrounded the camp. Then they waited until daybreak. Early in the morning one of the Indians arose, raked the embers of the fire together and began to prepare their morning meal.

This was Brady's opportunity, a sharp word of command, a crash from twenty-one rifles, yells of rage and pain from whites and Indians—and then silence.

Of the seven Indians five were dead, Brady himself had selected the chief, Bald Eagle, as his target. There was a peculiar fitness in this act, as Brady discovered some time later that his brother had been killed by Bald Eagle.

Of the two Indians not killed outright, one was so severely wounded that he died while running from the field, the seventh one escaped, seemingly uninjured.

The two captured children were rescued unharmed and taken down to Fort Pitt, along with the plunder taken from the Indians.

The Indians of that day along the Allegheny were far advanced in agriculture. They had taken up many ideas from the whites; they cultivated farms and built substantial log houses, in some instances they even squared the logs for their houses as carefully as the most painstaking white settler. This progress was especially the case with the Iroquois Indians, who had a settlement upon the Allegheny with over one hundred well-built log houses; their cornfields took up a piece of land almost six miles long.

In between the cornfields they had smaller patches planted with beans, melons, squashes and other products of the fields.

In August, 1799, General Bradstreet sent six hun-

dred men up the river from Fort Pitt to destroy this settlement. A small body of scouts and Delaware Indians accompanied the troops.

In sixty large boats and canoes the party started up the river, followed by two hundred pack horses and a large drove of cattle on shore.

Regarding the destruction of the settlement Brodhead sent the following report to General Washington:

"The troops remained on the ground three whole days, destroying the towns and cornfields. I never saw finer corn, although it was planted much thicker than is common with our farmers.

"The quantity of corn and vegetables destroyed at the various places, from the best accounts I can collect from the officers employed to destroy it, must certainly exceed five hundred acres, which is the lowest estimate, and the plunder taken is estimated at \$3,000.

"From the great quantity of corn in the ground and the number of new houses built and building, it appears that the whole Seneca and Muncy nations intended to collect in this neighborhood."

On the 14th of September the whole party returned to Fort Pitt without losing a man.

This expedition would have stopped the Indian raids for a long time if the English officers at Detroit and Niagara had not supplied the redmen with arms, ammunition and money and incited them to new raids.

But times change and with them the Indians. In

due course of time the Government established a reservation for the Indians at the headwaters of the Allegheny. There they finally settled down to a comparatively quiet life. Later on they became even willing to work for the white man, and many a raft of logs was formerly floated down the Allegheny manned wholly or in part by full-blooded Indians.

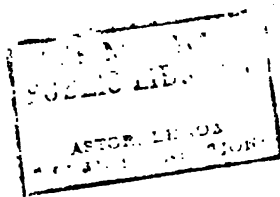
Most of these rafts were taken apart in Pittsburgh. There the Indians would then have a great jollification for two or three days, money would fly like golden sparks from a Roman candle—then the Indians would return to the lumber regions on foot.

At first the rough logs were collected in the tributaries of the Allegheny, later on they were built up into rafts in the river itself; then sawmills were erected in the woods and rafts of planks and boards shipped. Now the lumbermen have gone one step farther. They first saw planks and build barge bottoms out of them, these bottoms are then loaded with planks and boards and the whole is floated to Pittsburgh; there the bottoms are built up into barges; these are loaded with coal and are floated down the Ohio and Mississippi rivers.

The Allegheny River offered the Indians of the North, before the coming of the white man, an easy and safe route to the South. A favorite road was from Lake Erie overland to Lake Chautauqua. From the southern end of the lake a small stream leads to the Allegheny River; it has, however, so many shallows that it is difficult to navigate even with the lightest canoe.



ROLLING PLATE GLASS.



When the French settled in Canada they sought a better route; they made use of a small stream flowing north into Lake Erie through Pennsylvania, entering near the present city of Erie.

This stream was navigated as far as possible, then a portage of varying length brought the boatmen to the Riviere au Boeufs—Buffalo River—now called French Creek. This stream brought the boats into the Allegheny at Franklin.

From there on down to the junction of the Allegheny and Monongahela was, of course, an easy matter.

It is readily seen that a fort at the junction of the two rivers would be of inestimable value to the nation owning it. On this account both French and English were very anxious to have their flag flying there.

Washington wrote about the site as follows, in his journal in 1753:

“As I got down before the canoe I spent some time in viewing the rivers and the land in the fork, which I think extremely well situated for a fort, as it has the absolute command of the two rivers. The land at the point is 25 feet above the common surface of the water, and a considerable bottom of flat, well-timbered land all around it, very convenient for building. A fort at the fork would be equally well situated on the Ohio and have the entire command of the Monongahela River.”

The first attempt at occupation of a permanent character by white settlers at Fort Pitt, was made

on Sunday, February 17, 1754, when Captain William Trent arrived with a small detachment to erect fortifications to resist the French. It was not, however, until 1764 that the building of the town began.

Fort Pitt was commenced in 1759, by General Stanwix. This English fort replaced Fort Duquesne, built by the French and named after the French Governor of Canada. It was blown up by the French upon the approach of the English troops under General Forbes.

In 1764 Colonel Boquet erected his redoubt, known now as "the old blockhouse."

In 1770 some 20 houses clustered about the redoubt and gave shelter to the 120 inhabitants.

From then on the city grew very rapidly; in 1810 it had 4,768 inhabitants and in 1815 the number had increased to 8,000. Manufacturing of iron in various lines had also commenced. There were then in operation two steam engine works, four nail factories, a wire mill and a plow works, also three glass houses, a brass foundry and a large steam flour mill.

Boat building was also carried out on an extensive scale, the yards turning out steamboats, barges, keel boats and sea-going sailing vessels. Of these last the following were made: Ships—Louisiana, Pittsburgh, General Butler and Western Trader. Brigs—Dean, Black Walnut, Monongahela Trader, and Ann Jean. Schooners—Amity, Allegheny and Conquest.

A pleasant anecdote of one of these vessels is

recorded in the Picture of Cincinnati, published at Cincinnati. She had entered a port in the Mediterranean, and when the captain presented his papers, the examining officer read in his clearance, Pittsburgh, State of Pennsylvania, "Pittsburgh, Pennsylvania," said he, "there is no such port; your papers must be forged; here is some deception or piracy; we shall detain your papers and ship till we see farther into this." The American captain tried for some time, in vain, to convince him; till by the aid of the American consul and a map, he reluctantly admitted the possibility of there being such a place, from which a ship could be navigated, although two thousand miles from the ocean, by way of the Ohio and Mississippi rivers.

SLICE VIII.

We strike Kittanning and Ford City, and see how plate glass is made—Experiments in resuscitating the “apparently drowned.”

BUT enough of history.

At Kittanning, 45 miles above Pittsburgh, we stopped to replenish our larder and to get information of the outside world.

The town is situated on a plain, or bottom land, the hills here receding quite a distance from the river. There are several large manufacturing establishments in the town, three or four banks and a half dozen or so weekly newspapers.

The crew also counted 41 lawyers' offices on one short street and wanted to judge the inhabitants accordingly. The fact that Kittanning is the county seat accounts for the lawyers, however.

Kittanning has quite a historical past. In 1756 it was occupied by the Delaware Indians, who were then at war with the English. Colonel John Armstrong, after whom the county was named, captured the town after a short but bloody fight.

A few miles below Kittanning we came to one of the newer towns—a town of to-day. Industry

came, the wheels revolved, a town sprang up over night. It has no past like Franklin or Kittanning; it was built to order a few years ago and has kept on growing ever since. This is Ford City, the home of one of the large plate glass works of the Pittsburgh Plate Glass Co.

A short row and we had dropped Kittanning astern and sighted the dozens of high stacks of Ford City. A short distance above the town the river bank was covered with, no, composed of, broken plates, saucers, teacups and the like. My Partner decided that Ford City must harbor an especial kind of awkward servants. We soon saw, however, that the filling was merely waste from a large porcelain factory there. The waste or breakage of almost all other manufacturing establishments, from a cracker bakery to a locomotive works, can be used over again in some way. A broken soup tureen, however, or a split teacup is only of use in filling out some hole or other in the landscape.

At the plate glass works we were informed that we were at liberty to go in and see anything and everything we cared to see, to ask all the questions we cared to ask and to take along all the plate glass paper weights we cared to carry.

In our childhood days we were told at school that the Phoenicians discovered glass by accident. According to the tale told us some Phoenician mariners landed from their boat one day to prepare dinner on shore. They took some lumps of soda—part of the cargo of their ship—and used them as sup-

ports for their cooking pots. The heat of the fire melted the soda and the sand of the shore to glass. The tale sounds pretty, but viewed from a scientific standpoint it becomes highly improbable. Still, it shows us that Pliny was familiar with the composition of glass.

The earliest date of which we have positive knowledge of the existence of glass must be placed about 3900 B. C.; on the walls of the rock tombs of the necropolis of Memphis, dating from that time, there are carved figures showing glass blowers at work.

In the British museum there is an amulet of glass from Egypt, shaped like a lion's head; hieroglyphics upon it show that it was made about the year 3060 B. C. In the year 422 A. D., St. Jerome mentions glass. Several hundred years later the fact is recorded that the Church of St. Sophia had its windows glazed.

Plate glass was not made in comparatively large sheets on a large scale until the year 1700. Then its manufacture was begun in France. The works of St. Gobains, then started, are still in active operation and, until Americans began making plate glass, were the largest producers of plate glass in the world.

The first plate glass factory in England was started in 1772. At that time a "company of adventurers" (how appropriate that name would be for some of our stock companies now!) was chartered and incorporated under the title "The Gover-

nor and Company of the British Plate Glass Manufacturers." Workmen and machinery were imported from France and a factory built at Ravenshead, St. Helens, Lancashire. Like the mother factory at St. Gobains, the English plant is in operation at the present time.

The two principal kinds of glass made are hollow ware (bottles, lamp chimneys, etc.), and flat ware (window glass). For these, varying proportions of sand, soda and limestone are used, sand forming the main ingredient, window glass consisting of over one-half of it. On this account the quality of the glass is determined, to a great extent, by the sand used. For bottles and common ware any good white or brown sand can be used; for finer grades of glass the sand must be selected with great care. To the purity of their sand the French and Belgians owed their success as glass makers for so many years. The materials mentioned are mixed in their proper proportions and small quantities of various chemicals are added to influence or change the color of the finished glass.

In making plate glass the various ingredients are ground to a fine powder by themselves, they are then mixed and ground again; finally the mixture is passed through a sieve. This is done to get a very complete mixture. Without it the resultant glass is often blistered and consequently of inferior quality. Having mixed the materials thoroughly the next step in the process is the melting. This is done in so-called crucibles or pots made out of fire clay.

When ready for the furnace these pots look like ungainly tubs. They are three feet high, 44 inches in diameter, the walls are $4\frac{1}{2}$ inches thick.

These pots are of the utmost importance to the glass manufacturer in more ways than one. In plate glass making the success of the factory depends almost entirely upon them.

The clay out of which the pots are made is left lying exposed to the air for a long time, several years, if possible; during this period it is turned and shoveled over several times. In pot-making the clay is mixed up and kneaded very thoroughly in mixing mills. The workman then proceeds to make the pot in the following way: A slab of stone, somewhat larger than the bottom of the desired pot, is taken to build the pot upon. This slab works upon a pivot so that the workman seated before it can revolve it and thus reach every part of his work without getting up from his seat. He first dusts sand over the slab to prevent the clay from sticking to it; he then takes a roll of the dough clay and starts the bottom of the pot. He starts building in the center of the slab and works out in a spiral to the edge. Having finished the bottom the workman starts on the sides. He places one ring of kneaded clay in position after the other until the pot reaches the desired height. The pot is then taken to the drying room; here it is allowed to stand for twelve months, or even longer, in order to become thoroughly dry. When it becomes necessary to use a fresh pot it is baked first. In order to do this it is placed in a cold furnace and

is then gradually heated to a white heat. This usually takes from seven to nine days. After this time it is taken to the melting furnace and is there filled up slowly with the mixed charge. And now the pot is in the furnace ready for work, it may happen that after a few days' work the firemen notice melted glass under the crucible's resting place in the furnace; the glassblower finds that he does not get the required quantity of finished ware out of the pot—the crucible is defective and all of the labor has been in vain.

If we make soap bubbles we take a tube and collect a little soap water upon one end of it, blow slowly in the other end of the tube and thus get our bubble. In blowing glass the workman acts in a similar way. He uses an iron pipe about six feet long; dipping it in the pot he collects a small lump of the melted glass upon one end of it; by blowing through the tube he expands the lump into a round ball or bubble, or into a long cylinder by swinging the ball at the end of the tube in a pit over which he stands. If he places the ball of softened glass upon the end of his tube into an iron mold and then blows through the tube, the glass will, of course, take the shape of the mold; immaterial whether the mold is a plain figure like a bottle or a more complicated one. If pressure is applied to the mold while blowing, we get "pressed" glass; if we take a pressed glass salt-cellar and grind or cut down its facets upon a suitable stone we get "cut" glass.

Pittsburgh is the center of the glass-making in-

dustry of the world. Here every conceivable article of glass is made, immaterial whether it be a three-cent water tumbler or a sheet of plate glass as large as the side of a room. The window glass industry especially has grown wonderfully within the last few years. In 1880 there were 676 pots in operation; now there are over 2,000.

The city has no less than 13 art and stained glass companies to supply this high-grade material. There are five companies operating a half-dozen glass bottle factories of unusual size; two companies with extensive plants for making lamp shades of the costlier type, while one company operates no less than five factories making ordinary lamp chimneys. Pittsburgh has 11 plate glass companies, one of which is the largest in the world, with factories as far west as the Mississippi River. She has five table-ware glass factories and there are 11 window-glass companies which produce the larger half of all of the window glass in the country. To meet the requirements of this vast industry, there have sprung up clay pot factories, iron mold, and glass supply companies for supplying factories with materials and equipment, and 18 of these companies operate in Pittsburgh.

When the first plate glass plant was established in Pittsburgh the finished product sold at one dollar and forty cents per square foot. To-day the same quality of plate glass sells for twenty-eight cents per square foot. A sheet that cost \$150 then costs less than \$20 now.

In the manufacture of plate glass giant strides

have been made in America in the last few years. Formerly all of this glass was imported from France or Belgium, now plate glass equal to the best is made in many factories near Pittsburgh.

While other articles of glass are blown or pressed as we have seen, plate glass is rolled in a manner somewhat similar to that employed by the cook in rolling dough for pies, only here the dough is replaced by melted glass by the hundred weight.

The table upon which the glass is cast is from thirty to forty feet long and from fifteen to twenty feet wide. They are massive affairs of iron, copper or bronze, absolutely level and perfectly smooth. One of the smaller casting tables in the French glass house at St. Gobains weighs 55,000 pounds.

Along each edge of the casting table there is a strip of iron one-half inch high; on this a hollow iron roller, eighteen inches in diameter, rests. These rollers weigh several tons and reach across the entire table. The pots are in the furnaces, filled with glass mixture and are melting. Through a suitable opening in the furnace a workman watches them; as soon as the contents of a pot are melted, and ready for casting, the furnace door is opened, workmen grip the pot with huge tongs and place it upon a suitable carrier. It is then lifted over the casting table and its contents poured out upon it. The roller is then set in motion and flattens and spreads the liquid mass out into a large sheet of uniform width and thickness. A few seconds later, before the plate has time to cool, it is pushed into

the annealing oven and the casting table is ready for the next pot.

All glass must be "annealed;" that is, it must be cooled down very slowly, immaterial whether it is a lamp chimney worth a few cents or a sheet of plate glass worth hundreds of dollars. If the glass is not annealed it will be too brittle to use, and will break through mere handling. The sheet of glass is put into the annealing oven that has been heated to the proverbial "red hot." All openings in the oven are then closed and furnace and glass are allowed to cool for four or five days. The sheet is then taken from the furnace and is ready for the next stage of the process.

As it comes from the annealing oven the surface of the sheet is rough and wavy; it is rough plate. The sheets are examined carefully, imperfect ones are rejected, as it would not pay to grind and polish them. If possible, however, they are cut down to smaller sheets. The rough plate is now ground down and polished. First comes the rough grinding. To this end the plate glass is placed upon a solid iron table; plaster of paris is poured around the edges of the plate. When this sets and hardens it holds the plate as firmly as if it were fastened with bands of iron. Above this table two smaller plates or tables are fastened so that their lower surfaces rest upon the glass to be ground. A large number of iron bars, placed about three inches apart, cover the surface of the upper two tables. These two upper plates revolve upon the surface of the rough sheet of glass. Fine sand and water are

run upon the surface of the rough glass, the upper plates are set in motion and then slowly the iron bars grind the sand into the glass, cutting away slowly but surely all rough projecting surface. The sheet is then turned and the bottom is ground down in the same way. As the bottom table with the sheet of rough glass fastened upon it revolves in one direction and the upper, rubbing tables revolve in the other, the rough grinding is finished in a short time.

This rough grinding leaves the plate glass with a perfectly smooth surface. It, however, resembles ground glass. It is milky and opaque and must be polished before it becomes marketable. To this end the sheet is again fastened down upon an iron table with plaster of paris. A number of wooden arms are connected with an engine in such a manner that they pass over the surface of the glass with a circling motion. At the end of the wooden arms circular plates of wood, covered with felt, are attached. These arms are weighted so that they press down upon the glass. A polishing rouge—somewhat coarser than that used by jewelers—is stirred up with water and is then sprinkled liberally over the surface of the glass. The revolving scrubbers then soon polish the glass perfectly. When the upper side of the glass is smooth and polished to the right degree, the plate is turned, and the lower side is treated in the same way.

The glass is now ready for cutting. A sheet of plate glass is cut with a diamond just as easily as a sheet of plain, thin window glass. The cutting requires great care and experience, however, as the

large sheets, say 15 feet long and 10 feet wide, are not only inconvenient objects to handle, but represent a considerable amount of money. If one is broken the pieces are of comparatively little value. This breakage and the immense waste of material necessary to produce perfect glass together cause the high price of plate glass.

As the plate comes from the annealing oven it is one-half inch thick, in grinding it one-eighth of an inch is cut away from each side. In very good work one-third of the weight of the glass is lost through this grinding. A glass works producing 1,000,000 square feet of finished plate glass annually would make about 6,000,000 pounds of rough glass. This, when ready for the market as polished glass would weigh only 3,500,000 pounds, showing a direct loss in actual glass of 2,500,000 pounds. This is dead loss, material and labor.

* * *

As the visit to the glass house had warmed us up very decidedly we dropped down the river for a couple of miles and then proceeded to take a swim.

The triumvirate could swim like otters by this time, still, while watching them in the water the thought came to me if they knew what to do in case one of them would drown just about three-fourths of the way over, whether the other two would let him lie while they ran off some four or five miles for help, or whether they would try to bring him back to life themselves.

To settle the matter in the right way I called them ashore and read them a little lecture upon the meth-

ods used in resuscitating apparently drowned persons.

"Take the patient," said I, "and loosen his collar, roll a coat, or any other suitable object, up into a ball and place it upon the ground, place the patient upon it, abdomen resting upon the roll.

"Open the patient's mouth and insert a piece of wood, wrapped about with a handkerchief, to keep it open.

"Then press hard upon the small of the patient's back, up and down, to expel the swallowed water from stomach and chest. Then reverse the position and place the roll under the patient's back.

"The next step is to produce artificial respiration, if possible. To this end kneel on the patient and across him, pressing your two thumbs into the pit of his stomach, the extended fingers in among the small ribs.

"Then squeeze the waist inward and upward, squeeze hard and do not be afraid of hurting your man. Give a good, hearty squeeze every few seconds and keep this up for two hours, if there seems to be any hope."

I repeated the lesson until they knew just what to do and why they did it, then I told the cook to play the drowned man, and let the crew carry out the resuscitation operation.

I then sat down in the shade of a tree to watch proceedings.

It seemed to me that these would be simple enough, but I had overlooked the fact that I was dealing with an unknown quantity. I might have

known that they would make a circus out of a life and death matter, as it were.

"Here, you cook," shouted the crew, "you tumble into the river and I'll come along shore and hear you holler. Then I'll rush in and save your life."

Thereupon the crew walked up the shore a short distance, while the cook walked out into the river until the water came up to his knees, then he dropped down into the water, floundered and rolled about and yelled, "Help, help, I'm drowning, I'm drowning, I'm drow-wow, wow!" but the last "wow" stuck in his throat, for the crew had rushed in, grabbed him all over at once and had dragged him ashore, like a bag of potatoes, before he really knew what was happening. On shore he was dropped unceremoniously, while the rescuer ran into the tent for a blanket.

This he rolled up and placed under the cook as directed, then he commenced to knead, squeeze, thump and pound him like a little steam engine.

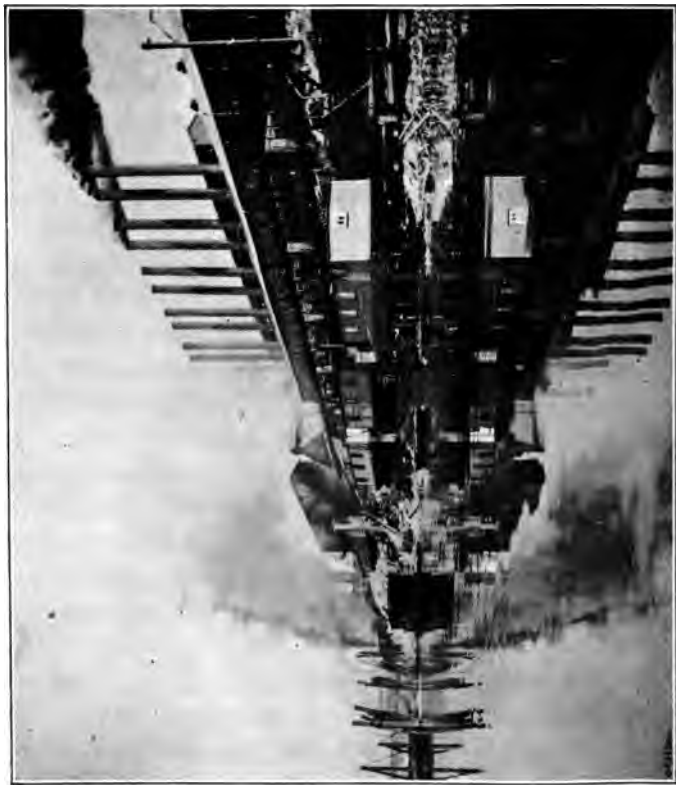
Just about this time the cook came back to life and commenced to squirm and wriggle.

"Lie still!" shouted the crew, "lie still, you're drowned."

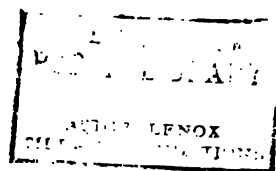
"I'm drowned, am I?" shouted the cook in return. "I'll show you, I'll——"

"You can't, I'm showing you; lie still, will you, till I bring your little life back again?"

"Get off my stummick, you little ijut!" came back from the cook, and then he struggled and rolled about until he got the crew underneath, then he jabbed both fists into the crew's short ribs and



HOUSE BOATS IN WINTER.



began to knead him in a most thorough manner.

"I'm drowned, am I?" he yelled. "Now you're drowned, and how do you like it? Now wait until I just squeeze the life back into you again.

"How do you like that, and that, and that?"

And with each word he gave the crew a squeeze that shoved a few more ribs out of place.

Then they rolled all over the shore, and rubbed sand and gravel into each other's anatomies and carried on otherwise in an awful manner.

And just then I should have gone down to them, like a Christian father with a great sadness in my heart and a hickory club in my hand, and pounded the two of them black and blue.

But I didn't. I refrained, I'm great at refraining; they were really enjoying themselves in their own sweet way. If I had mixed in, it would only have caused bad feelings between us for the next few hours. As it was I knew that the two of them would quit of their own accord just as soon as they had had enough of it.

And they did, then they came up smiling, hand in hand, and the crew said, so innocently and softly:

"Say, 'gator, it's your turn now, you go in and get drowned and the cook and me will go and resuscitate you."

But the navigator declined. Then the virile zealots suggested that I, Professor Anthony Black, should be resuscitated, but I told them I'd rather drown first.

SLICE IX.

*We have a great green-corn feast—An awful dream
—Adventures of the rain-drops—Freeport,
Tarentum and Natrona.*

“Let earth withhold her goodly root.
Let mildew blight the rye;
Give to the worm the orchard’s fruit,
The wheat field to the fly.

“Best let the good old crop adorn
The hills our father trod;
Still, let us, for His golden corn,
Send up our thanks to God.”

—Whittier.

WE dined to-day.

No, these words do not state the case exactly. In dining you sit down at the festive board (which usually groans) perhaps alone, perhaps with friends or even with strangers, to partake of a variety of foods.

You are expected to use seven different kinds of forks, a half dozen different knives, large and small (and you don’t dare eat with a single one of them,

that's as great a crime as poisoning your mother). You get big and little spoons, also imbibe divers liquids out of large and small glasses. Some of the food you eat with a fork, some with a spoon, some you eat with your fingers, and during the whole affair you must not break a single one of about two hundred and seventeen laws, customs and usages that other people made for your guidance while dining.

You cannot even chew with both jaws at the same time if you find something you like especially well.

You take a little ladleful of "consomme" or bouillon, then comes an English nibble of this French-named dish and a taste of that; you toy with a third and dawdle over a fourth, and this is kept up for an hour or two. This description does not fit our case; the statement must be changed.

We ate dinner.

To eat dinner, as ordinary mortals do, one sits down at table with his family. Perhaps grace is said, perhaps not. If there is soup, the father or mother passes each of the family a plateful. After this there may be a roast with a vegetable or two. It may happen in some cases that the soup plates are replaced by others after that course, or they may be retained for the roast. The meat is served and each diner is supplied with vegetables according to desire.

The children are handed their portions and are expected to eat them in silence and in partial observance, at least, of the table manners of the better

class. They do not do this, as a rule, however; generally they do not think it necessary to place an awkward restraint upon themselves; they break the little laws of table etiquette now and then without any great exertion or compunction. Or they join in the small table talk, just to show their elders that they are thoroughly conversant with all topics brought forward, immaterial whether it be the aurora borealis or the indurated rocks of the carboniferous period. If they are silent, however, you can depend upon it that their ears are standing out like the handles upon a Grecian amphora, in order to catch every word spoken at the table.

The youngest child is usually a privileged character. If it wants to eat soup it does so; if it wants to make a meal of pie alone, pie it usually is.

Our meal was not of this kind. I see I must make my statement shorter and more to the point.

We ate.

There, that's just right. We ate, and this is how it came about:

The navigator had taken a stroll down the river; upon his return he reported that he had seen a large flock of poulardes upon the way and was confident that he could shoot a few for our camp kettle the next day.

With that end in view he left the camp bright and early the next morning, accompanied by the cook and the crew. Along about nine o'clock they returned, bringing not only three nice, plump poulardes but also some lettuce, onions, carrots, a can

of cream and a roll of fresh butter. And they had fired only a few shots of small change to get it all.

From a neighboring field we added a plentiful supply of green corn; for a quarter of a dollar we had permission to take just as much as we wanted. Then we began preparing our meal.

The crew plucked the birds; the navigator and the cook cleaned the vegetables, while my Partner and I carried the milk and butter to our spring to keep them cool. Then we started off to gather blackberries for our dessert.

And then at high noon we sat down to a feast. I doubt whether Lucullus ever got more real enjoyment out of a banquet in his day than we did out of our meal upon the river bank.

Our mode of preparing the meal may have been barbaric when viewed from the standpoint of a French chef. Our manner of eating would certainly not have been pronounced proper by competent authorities. But what did we care?

We did not miss silver plate, cut glass, Dresden china and napery. A friendly robin perched in the boughs overhead furnished *tafelmusik*.

Nor did we sit down at table with due observance of head or foot; we minded not the position of the salt-cellar; we sat about just as we pleased.

While we had a variety of edibles, our *piece de resistance* was green corn on the ear.

There are various ways of eating green corn, but there is really only one satisfactory way. In this one way you select a nice, long ear of corn, taking

one end in each hand; you revolve it several times and give it a good looking over. Next you butter it carefully, from end to end, and note with pleasure how the butter melts and sinks into the corn. Then you sprinkle salt over it, evenly from end to end. Authorities differ in their views about the next step in the proceedings. Some say it is best to begin eating at the thin end of the ear; others advocate the opposite course. I myself incline to the latter view for the following reason: The nearer you come to the top of the ear the softer and juicier the kernels become, therefore, if you start at the thick end and eat your way forward the pleasure of eating increases with each particle taken; by the time, then, that you get to the little pearls at the end of the ear you are eating morsels that would please the pampered palate of a Brillat-Savarin.

While eating corn you say, for the time being at least, farewell to your higher qualities. You fall back to the status of the cave dweller; you recognize nothing beyond the fact that you are eating something good. You even go so far at times that you utter low sounds of contentment. Butter gets over your hands and face, but what care you? You are indifferent to everything, excepting perhaps the fact that there is more corn before you.

The Romans appreciated good viands, but what are larks tongues compared to green corn? They simply pale into insignificance when placed in comparison with an ear of corn coming out of its hot bath, like a foam-born Venus out of the ocean.

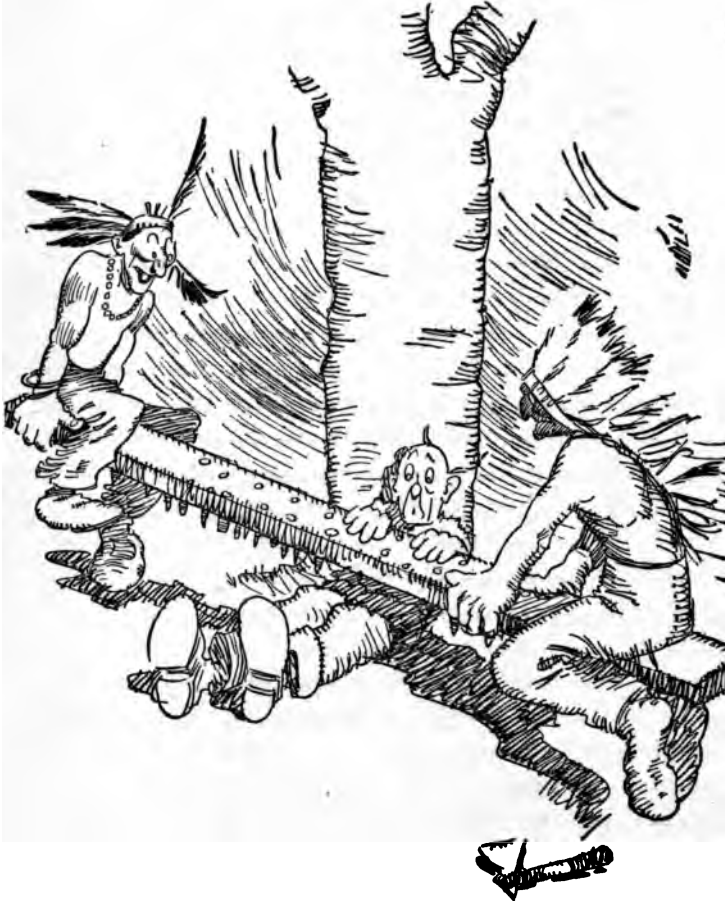
But all earthly pleasures come to an end at some stage or other, and so did our corn eating; with a sigh we laid aside the last "cob." We could eat no more.

Taking a cup of coffee and a pipe I sought a nice shady nook under an alder bush and stretched myself out in the grass, at peace with myself and the world. If a book agent had passed that way just then I am quite positive that I would have subscribed for an edition de luxe of the insurance laws of Yucatan. Even more: I verily believe I could have forgiven the parties who stole my new umbrella. Presently I saw two Delaware Indians coming down the shore, carrying a short piece of plank between them. As they came nearer I saw that the plank was studded with sharp-pointed nails, driven through so that an inch or so projected from the plank. With faces as stolid and immovable as that of the sphynx, they placed the plank across my breast, nails side down; then they sat themselves down, one upon each end of the plank, and began to see-saw gently up and down.

A tried to get up, but the more I struggled the deeper the nails were forced into my breast. I clutched at the stems of the alders growing near me, but they snapped in my hands. At last, when I could stand the agony no longer, a heavy torrent of water descended upon us, the Indians arose, took up their plank and vanished among the bushes.

I opened my eyes and the torrent of water re-

solved itself into a few scattering drops providentially let fall by a passing sun shower. And the Indians had given me a little taste of the punishment



"Began to See-Saw Gently, Up and Down."

which sooner or later comes in the wake of too hearty eating.

Looking into the alders above me I saw four sparkling drops of water hanging tremblingly to a slender branch, as the sun shone upon them they sent long beams of colored light out into the glare beyond, the colors changing with each vibration of the drops.

"Heigho, brothers," said one drop to the other, "where have you been? Tell your adventures."

"Pfu," said another, "I am all a-quiver yet from my fall. For weeks I drifted about as vapor, here and there as the wind took me. Presently a cold wind came. I shuddered and became drowsy. I lost my buoyancy and became heavy. Finally I began to sink; down, down I fell with increasing rapidity, until great good fortune dropped me upon this bush, whose leaves gently broke my fall."

"Oh, yes," said another, "that's not very new. We have all had the same experience over and over again, but tell us your adventures? Where have you been? What have you done? What have you seen?"

"The earliest event which I can remember," continued the first drop, "occurred long ago. For a long time I lay deep down in the earth, quiet and contented because I knew of nothing but the stone walls about us. One day, however, the other drops confined with me there found a tiny fissure in the rocky walls. One after the other we entered it, curious to see where it would lead us. On and on

we went, this way and that, wherever we found an opening. We were forced onward and upward and finally came out into the light of day. There we danced about and sang happily for a long time until one evil day a man caught a number of us. He threw us into an iron vessel, covered a lid over us and placed us upon a fire. I knew it was fire because some of my companions, who had come up from the deeper recesses of the earth, knew it and told us.

"Slowly the temperature increased. It gradually became stiflingly hot in the small vessel in which we were confined. At last we could remain quiet no longer; we rushed about, jumped up and down, and finally, when the heat had reached its limit, we changed into vapor and with a rush and a roar we lifted the lid of the vessel and escaped into the air.

"Woe's me, the man watching the iron kettle saw how we lifted the lid and recognized our power. Since that day he has mastered us and compels us to slave for him.

"I escaped into the air, but soon fell to the ground again. Then a longing seized me for peace and quiet. I wished to live again deep down in the earth, so I slipped into a crevice and began to work downward. But I was doomed to disappointment. In going down I came too near the root of a tree. It seized me and sent me slowly up into its trunk. Finally I saw the light again, imprisoned in a leaf high up in the three-top. There I lived happily for a long time. Finally a rough, cold wind came and

blew so violently among the tree-tops that my leaf and many others with it, fell to the ground. Lying there became very tiresome in a short time, so I escaped and went up into the air again. People said that the leaves were falling and winter coming, but what cared I for that? I was free again. I drifted about with the wind, here and there without any exertion on my part. Finally it grew colder and colder. I grew white with cold and then fell silently to the earth. There I lay upon the top of a high mountain for years. No birds came to sing to me; no trees, no flowers, no life about; everywhere silence and death. One day I noticed that my companions were becoming restless. They moved about slowly. I felt them all trembling beneath and beside me. The rocks under us groaned with our pressure. Then we all made one mighty effort. We moved forward a little, then farther and farther, faster and faster until finally, with a roar like thunder, we burst our bonds and went crashing away from the spot that had held us so long. Then came a glorious ride, down, down we went until we reached the valley below, miles away. In our mad rush we carried large masses of the mountainside with us; trees that had stood for ages, we picked up and carried along like straws to our resting place in the valley below. There I lay for a long time. Finally the sun took me up again. I wandered about in the air until I fell down here."

"That's the way we go," said another of the drops; "nothing can be destroyed entirely; we

change our form and wander about, but—— Hello, here's company!"

And company came. Patter, patter, patter, at first single drops, then more and more until we were forced to take shelter in the tents. My Partner and I took books and killed time that way. With the others it was different. First they played checkers. As that game provided amusement for only two at a time the third one felt bound to criticize each play and make sarcastic remarks. We were, therefore, all glad and relieved when the cook suggested going a-fishing. Thereupon they went over into their tent, donned their flannel bathing suits and went out. Two hours later they came back wet through and through, with a small string of fish and perfectly happy. We drew out the work of preparing supper as long as we could. We tarried longer over the eating, and then came the long, dreary evening. Finally after trying to read by the mild light of two wax candles, the cook suggested lighting a third one to see if the other two were burning. We gave up in despair (especially after the navigator made a frivolous remark about a wake and asked about the late lamented) and went to bed. Our tents were tight and pitched with an eye to proper drainage, we, therefore, listened to the patter of the rain-drops on tent and river until the song became monotonous and lulled us to sleep.

* * *

After leaving Ford City the navigator and cook took to the oars. We had counted upon making ten

miles or so, and then going into camp, but I had overlooked the fact that neither navigator nor cook would want to be the first to quit rowing, consequently they both rowed like automatic rowing machines and we sighted Freeport long before we wanted to.

Freeport is a nice, quiet little town about thirty miles above Pittsburgh. It was just one hundred years old upon the day we passed it. In 1798 a few residents of Pittsburgh found that town too large and noisy to suit them. They thereupon loaded their household effects into boats and trekked up the river into the wilderness, there to seek out a home where they could live out their days in peace and quiet.

They told us later on, down at Tarentum, that some of the original settlers of Freeport were still alive and carrying on business there. I cannot speak from personal examination, however, as we did not halt at Freeport. I merely repeat what I heard. I think it is merely a case of village jealousy. Both towns are very, very strict in enforcing the Father Matthew principles, you cannot—well, they usually get it up from Pittsburgh in boxes marked SOAP, but then that counts only for private families, the strangers “ain’t in it,” as the classicists say.

And yet Freeport has the largest distillery in Pennsylvania, and Tarentum has a large brewery, but the villagers “Touch not, taste not, handle not,” in their own towns. They go to the other one. Thus

the Freeporters all work down in the Tarentum brewery and the Tarentines all work in Freeport in the distillery. As the cook said, "it's a rum arrangement, but they manage to beer up under it." A mile or two below Freeport we put up our tents for the night, having almost exhausted our larder the five of us sat down to fish, hoping to sit down to fish later on.

I can recommend this spot to all future travelers who desire to try their luck with rod and line. Within an hour we had a dozen large bass and three perch. The spot is easily found. On the Freeport side of the river several huge rocks rise abruptly out of the water, while on the other side there is a newly painted red caboose, with two green flags on the rear platform, on the tracks of the Allegheny Valley Railroad. The caboose may have gone to Pittsburgh or Oil City since then, but the rocks are there yet.

After a short hour's drift the next morning we sighted all kinds of smoke down the river, smoke that looked yellow and smelled blue, when we got into it, smoke that looked black and smelled—no, it didn't smell, it was far worse, we will not analyze it any nearer, however. We were approaching Natrona, the home of one of the largest chemical manufacturing establishments in the Union. The village soon came into sight with its countless smokestacks, kilns, towers, smelting furnaces, mills and everything else connected with a large chemical factory.

Natrona deserves more than passing mention.

There have been more concentrated lyes sent out into the world from here than, but, no, I will not pun, I will merely state that Natrona is the home of the concentrated lye. In former times, the good old days we hear of, now and then, many housewives made their own soap. They would take a barrelful of wood ashes, pour water into it and thus extract the soluble salts, the potash; in this way they made a weak lye. This, in turn, was poured over fresh ashes until it dissolved soluble matter to such an extent that a fresh egg would float upon the surface of the liquor.

Then the housewife had a concentrated lye. For weeks and weeks she had been saving up all the old fat and grease from the kitchen; as soon as she had enough for a "boiling," she proceeded to make soap.

The grease was melted in an iron kettle over a wood fire out in the back yard, then the concentrated lye was added slowly and the boiling continued for an hour or two longer, under constant stirring, until everybody about the place was heartily sick and tired of the job. Then the stirring was continued for an hour longer to kill the smell.

Finally the soap was ladled into pans or boxes and allowed to set, it was then cut into bars and placed upon shelves in the kitchen, or up in the garret to harden and dry out.

There it slowly dried up, wrinkled up and shriveled up, and became as hard as a rock, as black as a bat and sharp enough to etch glass.

It was a good, enlivening kind of soap to wash

yourself with. No matter how sleepy and tired you felt when you got up in the morning, the moment you washed yourself with that soap you became wide awake all over. There was just enough free lye left in it to make your eyes smart for an hour after washing with it.

The boys and girls of those days (as we are often told nowadays) were famed for their bright red cheeks and clear skins, this has usually been placed to the credit of their simple, plain food and their regular way of living. This is wrong, all wrong. We must give credit to the home-made soap. It simply ate away the outer skin and kept a new one growing all the time.

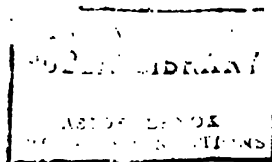
Soap making at home underwent a change when Natrona entered the field with its concentrated lye. Now the housewife buys a can or two of pure white lye, melts her fat, or purchased tallow, adds the lye, stirs for a few minutes, perfumes with a few drops of citronella oil and has a soap that can be used to wash silverware, the babies' faces, the family diamonds or the kitchen floor.

We stopped at the works for several hours and saw them fill off concentrated lye at the rate of thousands of boxes hourly. The navigator started off on a questioning tour and was surprised when he heard where all the materials used in soap making had their origin.

First of all caustic soda, the proper name for concentrated lye, must be made. To this end common salt is decomposed with sulphuric acid; the



"I TO THE AMPHITHEATRE."



resultant salt cake, as the combination of sulphuric acid and salt is called, is then heated in furnaces with limestone and coal. The mass as it comes from the furnaces contains carbonate of soda, this is leached out in large vats, with cold water.

“In making the sulphuric acid, the chemist uses sulphur and saltpeter. The one comes from Sicily or Spain, the other from South America. The tallow used in making the soap can come from American cattle, or olive or cocoanut oils from France and Africa can be used. To crown all, the soap can be perfumed with an artificial odor made out of English coal tar in Germany.”

In making the sulphuric acid we are not restricted to the use of sulphur, or brimstone, as a starting point. At Natrona enormous quantities of a sulphur ore, mined in Spain, are used. This ore contains sulphur, iron, lead, copper, traces of silver and a very, very little quantity of gold.

By a series of wonderful chemical reactions all of these metals are obtained, one after the other, out of the ore.

The sulphur is burnt off first, in suitable furnaces, it is then converted into sulphuric acid. The copper is recovered by itself out of the cinder left after the sulphur is burnt off; lead, silver and gold are then taken out in turn; finally the last residue, containing all of the iron, is sent to the blast furnaces to be smelted into pig iron.

The degree of civilization of a country can be measured better by the quantity of soap it makes,

than by the quantity it uses, as making the soap starts countless other important manufacturing processes.

"That's all well and good," finally said the cook, "but we are going to camp somewhere along the river to-night, and we want to eat some supper before we go to bed, so we had better start on down stream and find a good camping place."

At Valley Camp we came to a stretch of shore about a half mile long without any houses near the river. The village of Arnold and the camp are about a half mile back from the river upon the hill-side.

The camp itself is an assemblage of frame cottages in an enclosed patch of oak woods. Here a few dozen families from Pittsburg pass the summer eating canned goods and playing croquet. At times they go back to the city for a good meal. Twice a day the female portion of the population troops down to the railroad in the morning to see their husbands off to the city, in the evenings to greet their home-coming and to help carry bundles.

We pitched our tent on the shore under a dense growth of willows, beside the house-boat of an old white-headed mariner. I asked the old gentleman if he had any objections to our camping in his front yard, as it were. He had none. Quite the contrary, he helped us put up our tents; part of our supper, potatoes *au naturel*, his worthy spouse cooked in their kitchen. At and after supper he entertained us with the little idle chit-chat of the

river. He told us how the river had grown, meaning the towns upon its banks. He also told us the old, old river anecdote of the Apollo Steel Works.

The Apollo Steel Works are up on the Kiskiminetas River, a small tributary of the Allegheny, entering it near Freeport. Once upon a time—a few weeks, months or years, according to the storyteller—a newly arrived Irishman came to work there. Wishing to be polite he asked a fellow-workman for information regarding the bosses. Talking about his employers at home the next night, he closed with the remark:

“An’, shure, they tell me that the best of all of thim, Mr. Apollo, has been dead for over one thousand years. I niver knew the mill was so ould.”

Down in Pittsburgh we heard the same tale, only there it was the Cyclops foundry, and Mr. Cyclops was the deceased member of the firm. He also had been dead quite a number of years.

Our friend also called our attention to Nellies Springs, and wanted to know if we had ever heard of them. Upon receiving an affirmative answer he pointed to two barrels, half buried in the river bank, and said:

“Those there is them.”

“Oh, no,” replied his wife, “you should say ‘Them there are they.’ Ain’t I right, Professor?”

“You are both right,” answered I. “It all depends on whose grammar you studied. You can also say ‘them’s them’ and be just as correct.” And why not? Why should these humble river folk have

their nebs whittled down to sing as others think they ought to sing? Let them say "that's him," or "it's me" if they will. Between you and I, where is the harm?

We had heard of the springs while far up the river, not only of Nellies Springs, but of others. In fact, we found excellent springs every dozen miles or so on our trip. One spring after the other became known to the river men on their trips up and down stream, the up trip before the advent of the railroad being always made on foot.

In due course of time the junk boat came, buying old iron of every description from the farmers, paying either in cash or calico, chinaware or other commodities.

These voyageurs either walled in the springs with a few blocks of stone or sunk a barrel in the ground and thus made a small reservoir that became especially useful if two or more boats anchored there at the same time.

SLICE X.

*We land at New Kensington—Aluminum making—
The “euphony” of names—A story of Jupiter
and Neptune—Jo-boats—American and Euro-
pean housewives.*

AT the next town, New Kensington, we decided to stop for a few hours in order to visit some of the manufacturing establishments there that have made a city out of a farm in a few years.

The builders of towns along our river are men of good common sense in one respect, at least. They did not go to the four quarters of the globe for names for their towns. In coming down the river we do not jump from Syracuse to Athens or Toledo, or from Lisbon to Cairo or Delhi. We pass quietly from one good American name to another—Franklin, Foxburg, Brady, Arnold and—but, dear me, I am hoist with my own petard. Right across the river is Tarentum; then comes Verona, finally, a few miles farther up we land on Parnassus, and that all in one brief day.

Surely, more appropriate or pleasing names could have been found for these towns. The history

of the valley would have furnished American, English or Scotch names in plenty, to say nothing of the available Indian names.

It's the same thing, now and then, in naming children; like villages, they often receive names that are not in harmony throughout. Cyril Sydney by itself sounds nice, it is euphonious; add Herschheimer and you knock euphony into a cocked hat. And Marmaduke Maxwell; add Scraggs and what a change!

And think of the torture a child must often suffer through its name! We had a Marmaduke at school with us once upon a time. We never gave him his right name. The nearest we came to it was Marmalade. Generally we called him "Jelly;" at times we simply called him "Jam." As he grew older he dropped the Marmaduke entirely and went by his second name of John.

Our friends of the zoological, pomological, geological and other ogical names are the worst sinners in this respect. Just look at:

Winifred Ethelbert
Hirsch
Katz
Rothfuchs.

Or Maurice Stanley
Birkenbaum
Mandelbaum
Feigenbaum.

Or Algernon Vivian
Frankfurter
Deidesheimer
Libienthal
Sonnenschein.

Here is where the son of Erin shows his good sense. He knows he is Irish and he isn't ashamed or afraid to show it. Hence we see names like Paddy McGhee, Dennis O'Brien, Mickey Dugan, Terrence O'Toole or Barney Rafferty.

Of course, a village has no feelings, like a child, but, then, the villagers ought to see to it that just one little something or other about the place calls attention to the renowned place after which it was named.

This would be a simple matter. It would not be necessary to build copies of temples, towers, palaces or pyramids. It could be done in a cheaper way.

In Tarentum, for instance, attention might be drawn to the ancient Tarentum by having a few epigrams by Leonidas tacked up here and there. At Parnassus one of the Nine might be posed on the summit of the hill overlooking the town. Thus, Thalia, doing a turn with Hans Wagner, might be postured in bloomers, baseball mask in hand, and would draw attention to the Nine of the past and present at the same time. Or Terpischore might appear on a bas relief in burnt cork with bones and clogs, giving a song and dance with Muggsy McGraw.

And so far as Verona is concerned, well, we will get to Verona later on and hear of the terrible doings there some time ago.

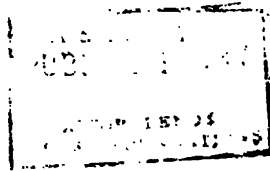


The Ancient and Modern Nines.

“What does Parnassus mean, anyhow?” asked the crew.



STEAM LOCOMOTIVES."



"Parnassus," replied the navigator, "was a mountain in Greece, the home of the Nine Muses, and connected with the classical Greek myth of the creation. The Greeks divided the time after the creation into different ages. The first age was one of peace and happiness, the people simply sat around and sang songs of praise to the gods. They were innocent, consequently good. This period was called the 'Golden Age.'

"In course of time the people degenerated a little. They took to fishing and telling fish stories; some of them even played holly golly and other games of chance. The woman folks began arranging their hair in fancy knots and even went so far as to jab flowers into the knits. This period was called the 'Silver Age.' It was followed by the 'Brazen Age.' Then came the 'Iron Age,' the most degenerate period of all. Crime covered the earth, truth and honor had fled. The world was filled with war and violence.

"And when Jupiter remonstrated with the earth-dwellers and threatened them with dire punishments, they mocked and derided him. They even became humorous in their heavy, antediluvian way. 'Do your worst,' thy jeered, 'Do your wiener worst.'

"That settled matters, once and for all. You cannot pun that way in safety with the gods.

"The gods, in despair, then deserted the world, the last to leave being Astraea, the goddess of innocence and purity.

"Finally, Jupiter decided to destroy the earth and

its inhabitants. Neptune's aid was called in. The earth was flooded, and the race of man swept away, two only being preserved.

"Of all the earth, the top of Mt. Parnassus alone remained above the water. There Deucalion, son of Prometheus, and his wife, Pyrrha, found refuge. Deucalion had always led a just and pure life and his wife was a faithful and constant worshipper of the gods. Jupiter remembered this, and, when he saw these two alone of all the earth's inhabitants alive, he caused the waters to recede and saved their lives.

"With the falling of the flood the two came down from the mountain. On the way they entered a temple to offer thanks to the gods for their deliverance and at the same time to ask for guidance. In the temple a voice spoke to them and said :

" 'Depart from the temple with heads veiled and garments unbound, then cast behind you the bones of your mother.'

"They heard the voice in silence and astonishment. Finally Pyrrha spoke :

" 'We cannot profane the remains of our parents in such a manner.' But Deucalion said, 'The command is easily obeyed. The earth itself is our mother; her bones are the stones. These we can cast behind us without fear of being impious.'

"Accordingly they started down the mountain. On the way they picked up stones and threw them over their shoulders. Then a strange thing occurred. The stones became soft and assumed

human shapes. Those thrown by Deucalion became men, while those thrown by Pyrrha became women.

"In this way the world was repeopled after the deluge."

But let us come back to the present time.

New Kensington is one of the newer towns along the river. Ten years ago the town site was farming land; then a mill was built, a second followed, a third and fourth came; now the town has 10,000 inhabitants. Mills of all kinds keep it growing so fast that a new census would be necessary every month to enable the correct number of inhabitants to be given. Of the many industries represented, the most prominent ones are plate and common window glass manufactories, tin plate mills, white lead works, potteries and the most extensive aluminum works in the world.

The time is easily remembered when a piece of aluminum was quite a curiosity; now it is in use, to a very great extent, all over the world, replacing many other metals. It is one of the lightest metals in use. On this account it is used extensively for military buttons and canteens; upon bicycles; on account of its silver white color and the fact that it does not tarnish upon exposure to moisture it is used for harness trimmings. It replaces copper for telegraph and telephone wires. It is used in making kitchen utensils, jewelry, bric-a-brac and other small articles. Immense quantities are used by the steel makers. In common with other metals, aluminum is present in every clay, sand and stone

we see about us. Our common building bricks contain several per cent. of it. To obtain it in a free state as metal, a clay containing from fifty to sixty per cent. of aluminum in combination with other elements is used as a starting point. This clay is ground to an impalpable powder; it is then placed in carbon crucibles with strips of copper; an intense electric current is passed through the crucible, the aluminum is freed from its combinations and flows in a melted state through a small opening in the bottom of the crucible. The melted metal is run into bars and is then ready for the rolling mill. The metal was discovered in the year 1828. It was, however, so difficult to obtain in a metallic state that it remained very rare and scarce for many years. In 1874 but two countries produced appreciable quantities of it—France 2,000 pounds and England but 1,500; the price then was about \$7 per pound. With improved methods of manufacture the quantity produced increased and its cost decreased in proportion. In 1898 the output was 5,200,000 pounds.

A shower overtaking us a mile or so below New Kensington, we took refuge in the cabin of a "Jo" boat which we overtook on its way to Pittsburgh with a load of scrap iron. Friendly and accommodating, like all of his kind along the river, the captain, crew, owner and all else of the boat would not permit us to leave until the shower had passed and our boat was thoroughly baled out and dried.

It amused us to see how these floating merchants

and traders kept track of one another. Some sixty miles up the river we had anchored beside a houseboat for an hour or two. As soon as the boatman heard that we had come down from Oil City he wanted to know where his friends were. He took it for granted that we had spoken to every boat on the river. "Tom's boat was somewhere below Parkers, wasn't it? He was loading scrap. We ought to had a-stopped at Bob's boat at Catfish where he was loading tan bark. Bob was the best fiddler on the river. Sam was getting out paving stones at Sandy Creek or summers near there, but perhaps he was 'loadened' and had passed on down the night before," and so on.

The stretch of river covered by these boatmen is so short that they cannot very well help becoming known to one another. They also know the farmers and the farmers know them, having in many cases plied the same vocation themselves, or floated oil down the river in bulk or barrel before the advent of the railroad and pipe line.

All this may account for the honesty and good nature of the boatman above Pittsburgh on the Allegheny. Below Pittsburgh, on the Ohio, he is very often the opposite and the farther down the river you get the lower the standard of morals seems to be placed. All in all, the Allegheny joboatman leads a pleasant life. The cares and worries of the city dweller do not come near him. In one way, however, their lot could be greatly bettered. Instead of sending missionaries to the farthest ends of the

earth to deprive the natives there of their blessed ignorance and innocence, a few good cooking, female missionaries should be sent up the Allegheny River to the house-boatmen. Not that the missionaries should be served, cooked or fried in various tasty and toothsome ways, but that they should teach the wives of the boatmen a little of the art of kitchen management.

In books of travel you read now and then how the poor peasants in Europe must live upon a paltry few pfennigs, kreutzers and other small things a day, but the poorest day laborer there, in a back woods village, 17 kilometers from the nearest cross-road store, gets his three and a half cent meal served up in a more palatable and digestible form than our joboatman does his meal that costs ten times more.

But then the European peasant's wife usually knows how to cook, while the American wife usually don't know, don't want to know, wants to simplify matters, or is simply too indifferent. Also money saved in the Department of the Interior can be used in the Department of the Exterior. Starvation fare is not visible, but a picture hat is.

Just look how dinners are being prepared all around us: A few minutes before mealtime the wife opens a convenient can or two, throws a piece of steak or a couple of chops into a pan and fries them to death. Then the table is loaded down with a lot of cakes, jelly, pickles, ice water, a decorated salad that looks like one thing and tastes like something else, and pie, of course. The table figuratively

groans under its load. An hour after the meal the husband does the groaning. Then he goes to Schwip-peldildrich's Rathskeller or Casey's Irrigating Parlor and lubricates his digestive tract at fifteen cents per lubrication.

Just think of it! fifteen cents, day after day for an ounce of digestion corrector? Of course, they don't all do this, some go to the drug store and buy dyspepsia tablets. That's worse. And then when one of these sallow-faced, dyspeptic, half-starved, canned-goods eaters gets opposite to what his wife sarcastically calls a "German dinner," he eats till the hide cracks, as our ash man says he does.

And after dinner the wife goes to the Carnegie Library and copies a lot of stuff out of different book, ties it together with a little original stuff of her own creating, and a pink ribbon, and then she has a nice, long, learned paper for her club about the Permeability of the Soul, Similarities of Conscience in Hiawatha and Scipio Africanus or the Physical Ascendancy of Primordial Cosmic Force.

And yet we wonder at the terrible increase of crime!

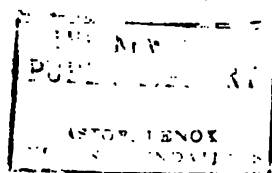
But let us return to the river.

With the approach of cold weather the houseboat owners seek winter quarters for their craft, either at one of the towns along the river or down at Pittsburgh. There the boat is drawn up on shore out of the reach of floating ice. In many cases the boatman secures work in one of the mills near the river. His boat is then drawn up high and dry as

if a permanent stay was thought of. But once a boatman, always a boatman; with the first spring days he becomes restless; perhaps he struggles for a time with the desire to return to the river; perhaps his wife prefers the regular life and steady income that go with work in the mill. The end of the struggle usually comes when the last ice floats down stream. Then the jobboat is found floating down with it, or being towed up stream by a horse or two. The free, civilized vagabondage of the river trader has commenced again.



"AT CITY LIMITS."



SLICE XI.

*We learn details of a fierce Italian feud at Verona
—the true story of Romeo and Juliet—A
Scrubgrass episode.*

“Come, go with me. Go, Sirrah, trudge about
Through fair Verona.”—Romeo and Juliet.

OUR next stop was at Verona, my Partner insisting upon hunting up “Juliet’s” tomb the moment we landed. On the other hand, I wanted to go to the amphitheater first, and as each of us was very decided about the matter, we acted according to the old motto:

“For the best way to do is to do as you please,
For your mind, if you have any, will then be at
ease.”

So we went our own ways, I to the amphitheater. Passing under its massive arches, I soon stood in the arena, and gazed about me.

What tales could these old walls tell of bygone days? Of brutal age, of manly combat?

I saw the seats of massive stone, rising tier upon

tier; here and there an arched opening gave a view into small chambers under the seats, the cages in which the wild beasts were confined before being set loose into the arena.

I saw the seats filled with spectators, thousands upon thousands of them. I felt the impressive hush before the final blow fell, of gladiator upon gladiator, or lion's paw on Christian breast. I heard the loud roar of the populace when the end came. Then my arm was clutched and a voice cried in my ear:

"Hey, you, there, get off the track or the shifter'll run you down!"

The dream passed. Gone were gladiators, lions and Christians. Gone were the Capulets and the Monteechi, the Piazza delle Erbe resolved itself into an Italian peanut and banana stand, the arena housed locomotives.

Oh, Verona, Verona, ancient, world-renowned city, where, under divinely blue skies, palaces, triumphal arches, carved balconies and columns give us a faint idea of former magnificence; would that one of the paladins of Carolus Magnus could step down from his resting place upon the gate of your cathedral and visit our Verona. Would that Can Grande could step down from his iron horse and see the iron horse in our arena in Verona.

They would stand in the streets and dream as I did.

The participants in an Italian feud which took place at Verona, a number of years ago, and as a result of which five bright young lives and one el-

derly one were snuffed out, have also become famous.

Of course it is very flippant to talk of snuffing out a bright young life just as if it were a cheap tallow candle, but that's how these ignorant foreigners value life.

With the Dago and the Hunky and the Polack it's a jab here and a stab there, with a knife, an old pointed file, or a coke fork. And that ends chapter one.

Then the relatives come into the story, and jab and stab a little on their side, a couple more dead Hunkeys, end of chapter two and all is hunkydory. That's how it went at Verona.

The details of the affair are about as follows: There lived at Verona at that time a young man by the name of Romeo Montague. He was quite a bright young fellow, of about sixteen, and was really well liked by all up there.

At a dance one night he saw Julia Capulet, a sweet little thing of about fourteen, and fell head over ears and plush cap in love with her. He got it so bad that after the dance he hung around Julia's house and whistled for her until she came out on the porch. Then the two giddy young things hung over the porch rail and talked mush until the roosters crowed for to-morrow.

In the course of the cooing Julia, like a sensible little woman, asked Romeo who he really was, what his father did for a living, and a few other sensible questions every girl in her position should ask.

She was dismayed, at first, when she heard that he was a son of old Montague, who ran a banana stand in opposition to Julia's father.

But Romeo was a bright one, he was indeed, he turned it around and showed that his father had been in Verona several years before Julia's father even knew there was such a place.

But in the end neither of the two cares a rap for either of the fathers, he was satisfied with her and she with him, and the fathers could go to Parnassus or Scrubgrass if they didn't like it. It was all a matter of name anyhow, cooed Julia, and then she spoke those words which have become famous all over the world, says she:

"Oh, be some other name! What's in a name? That which we call a rose, by any other name would smell as sweet."

By the time the roosters commenced to crow they had everything settled down to a fine point; they decided to go and get married. As they were both too young in years to be married right off like that in Verona, they took the next train and went over the line to Steubenville, O. There Father Lawrence, a personal friend of Romeo's, married them in short order.

Then they went back to Verona and outside of these three and Julia's old nurse, none were wiser.

But love's young dream had a very rude awakening. Going down Railroad Avenue that same evening, Romeo saw a crowd gathered near Sweeney's saloon. Pushing his way through the crowd he was

knocked all endways to see his own cousin Merc Montague and Julia's cousin, Tybe Capulet, doing each other up, or trying to.

Rushing to separate the two, Romeo was overtaken by the fate which usually overtakes such meddlers. He grabbed his own cousin, Merc, and pulled him away, then Tybe Capulet, the dirty Dago, stuck his knife under Romeo's arm into Merc's side, inflicting a wound from which Merc died in a few seconds.

Then Romeo lost his head completely; he, in turn, drew his knife, and stabbed Tybe Capulet thirteen times, seven of the stabs were fatal.

The affair created intense excitement and, to prevent a lynching, the trial was held right there on the street. The jury found Romeo guilty of manslaughter in the fourth degree and recommended him to the mercy of the court.

Judge Escalus, in sentencing Romeo, told him that he would bear in mind the fact that the two men killed were Dagos and that a lot of blame really fell on Tybe's shoulders for not killing Romeo also. He suspended sentence on condition that Romeo left Verona immediately. This Romeo did on the 6:18 freight.

When Julia heard of the sentence of the court she hunted up Father Lawrence right away, told him how Romeo had been driven from town and how her parents had decided that she had to marry a young fellow named Earl Paris the next day, a

young fellow whom she just couldn't bear the sight of.

Father Lawrence was a smart one for sure. He gave Julia a little bottle of dope and told her to go home and take sixteen drops in a glass of water before going to bed that night.

The sixteen drops would send her off into bye-bye land for forty-two hours. Then while she was doing her forty-two hours R. I. P. act in the family vault, he would go and get Romeo and bring him back to Verona on the d. q. Then they two could hike away together and start life anew somewhere else.

But just see how things happen: Father Lawrence's messenger to Romeo was quarantined in a speak-easy at a suburb of Verona called Oakmont.

And when he broke out and gave the mason's sign of distress on the sidewalk the police ran him in for creating a disturbance. And I don't blame them. Just see how the sign is given:

You stand on your left foot and on it you have your right rubber. Your right foot you stretch out at a right angle to your body. Your right arm is held high above your head and with it you hold your left rubber, filled with mortar. Your left arm is held out at a right angle to your body, fingers spread far apart, and bringing the base of the index finger to the base of the thumb and forming a right angle therewith and thereof.

Then you wink five times and cry out in a loud tone, "Tad," "Tad," "Tad," three times.

If a mason hears you he will answer, "Pole,"

"Pole," "Pole," three times. Then you join hands and dance around three times in a circle and sing "Tadpole," "Tadpole," "Tadpole," three times.

Then you go to the nearest dairy and buy each other a pint of goat's milk. Any mason will tell you why they buy goat's milk.

Let us return to Romeo.

Father Lawrence's messenger was thus prevented from delivering his message and so Romeo heard of Julia's death from other parties, and, of course, got it all wrong. As soon as he heard the dreadful news he decided to gaze once more upon Julia's face and then join her over the river.

To this end he got a full pint of the reddest-colored, highest-flavored and strongest-preserved raspberry juice his father kept for the soda fountains. With this in his pocket he went to Julia's tomb.

There at the door he met young Earl Paris, who had come to place a bunch of flowers on Julia's bier. When Romeo saw him he just went daffy all over all at once. So did young Paris.

They didn't say much, but each drew his case knife and got right down to carving. After a few skillful cuts young Earl Paris was a has-been for sure.

Then Romeo entered the vault, gazed long and tenderly upon Julia, and took a pull at his bottle in between gazes. The raspberry juice soon got in its work, the bottle slipped slowly out of his hands, he

slid from the bench to the floor, and sailed silently over the Styx to join Merc, Tybe and Paris.

And just then! the horror of it! the forty-two hours were over, the dope had run its course and Julia awoke. Awoke to see her husband that should have been, Earl Paris, dead on one side of her, and



"Your Right Foot is Stuck Out."

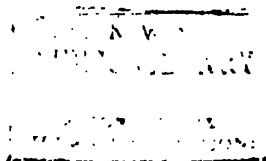
her husband that had been, Romeo, dead on the other.

She called upon Romeo to get up and speak to her, but Romeo wasn't answering calls from Verona just then.

Then Julia decided to follow him. As she sees the empty bottle she says:



“THE LOWER END PASSES INTO THE CITY LIMITS.”



"What's here? A cup closed in my true love's hand? Poison, I see, has been his timeless end. O clump, drank all and left no friendly drop to help me after."

Then she reached over and drew Romeo's knife out of his belt and—but let us close the door of the vault, the scene is too sad to dwell long upon. She did the bye-bye act this time for keeps.

When Romeo's mother heard the sad tale she said, "Oh! Ah!" in Italian, sat down on a chair, gasped a couple of times—and then number six went where they use wings to travel about and not the choo-choo cars.

It was all very, very sad, of course, and created great excitement at the time. Julia had a regular Italian funeral with banners and bands and white-dressed girls carrying flowers.

Later on, when the affair had been worked up for the stage by a man named Shakespeare, people came from miles and miles away to Verona to see the place. Then the folks there saw that there was good money in it for them and they went for it and commenced to sell all kinds of Julia and Romeo relics.

They even served a soup at the hotel there, called *consomme julienne*, they thought this would sound better than a "Verona half dozen fry" as was first suggested.

They point out a marble tomb at Verona and call it the last resting place of "Juliet." My Partner insisted upon having a piece taken from it as a relic.

At home the little piece of marble found a resting place upon my Partner's desk. There it was sighed at and sentimentalized over with many an "Ah, me!" and "Oh, my! From the tomb of 'Juliet!'"

And it really was.

About 80 yards from it, from Piccardini, the sculptor's workshop, there I picked it up, with a couple of other relics from celebrated tombs, monuments and cathedrals.

Vandals—English and American tourists, so they say in Italy now, although Americans were scarce then—destroyed the original marble tomb of Juliet years ago. The present one will be destroyed in its turn in a few years; then another one will replace it, and it in turn will be the only original one.

But I must get out of Verona, return to the river and the Liana; this wandering off thousands of miles and back to the dark ages will never carry us down to Pittsburgh.

But why do people name their towns in such a manner? A man cannot help drawing comparisons when he meets such names. Why not call the town by American or Indian names, or even build up a name like Scrubgrass?

This is the name of a village up the river, near Franklin. We halted there, at the beginning of our journey, to lay in a supply of food. We landed, and I went up to the store.

"Let me have two dozen eggs, please," said I.

"Got none," answered the clerk.

"Well, then, give me a pound of butter."

"Don't keep it."

"Dear me! You can give me three loaves of bread, I suppose?"

"Don't sell bread."

"Oh, well, then, let me have two quarts of milk," said I, and deposited my kettle and a silver dollar somewhat heavily upon the counter. But the clerk answered, in his wind-me-up-and-drop-a-nickel-in-and-I'll-answer-six-questions way:

"Don't handle milk."

Now, this was very provoking, indeed; but there was worse in store for me, and right in that store, too. The clerk finally informed me that he doubted whether I could purchase any of the desired articles in the village, there being no outside demand for them, the people seldom had more than necessary to supply their own needs.

I looked about the store in despair, hoping that I might see some article or other of an edible or drinkable nature. But all that I could see was a very complete line of agricultural implements, dry goods, tinware, paint, salt fish, boots and shoes, soap, chewing tobacco and several hundred other articles.

Finally I said to the clerk, in sheer desperation:

"Haven't you got anything that I can take along? We're camping out, you know, and now that I am here, I might as well take something, if you have it."

The clerk looked at me for a little while, and then looked all over his shelves. Finally I followed him

to the rear of the store and helped him look into a large glass wall case there. Suddenly he smiled an "I-belong-to-your-secret-society" smile, got up on a stool, put his arm back into the corner of the cupboard, and reached down a big, fat, black, dusty bottle.

I took the bottle and hefted it, and thought of Mr. Gibson. My thoughts even flashed off to Medford and from there to Jamaica. And why not? Unexpected finds are made, now and then, on the shelves of these old country stores.

I even wondered whether I could smuggle the bottle into the boat and keep it there, without having it discovered, for a couple of days, just a couple, no longer. At any rate, I determined to try it.

Then I lifted the bottle up a little higher, removed some of the dust and cobwebs, and looked at the label.

This is what I read :

Smythe-Browne's
Celebrated
Lactated Pepsin.

A permanent solution of milk and pepsin, capable of digesting 3,000 times its weight of freshly coagulated and disintegrated egg albumen. Exceedingly valuable for infants and convalescents.

Dose—A tablespoonful three times daily.

I placed the bottle upon the counter and walked

out in silence. When I got back to the boat I took my seat and said :

“If any of you dare mention milk or eggs I will throw you overboard and make you walk home.”

I related our experience to one of the natives a few miles below, later on. He said I should have looked about the store a little closer; they always had crackers and store cheese in stock.

“And, sir,” said he, “they keep the best chewing gum between Emlenton and Oil City.”

Now, there is some sense in calling this town Scrubgrass. Suppose its name had been Eden or Emporia, or something similar, and you had asked for just one pound of butter and had been sent away empty-handed?

SLICE XII.

We reach city limits—Particulars of a terrible time in England.

WE reached the city line of Pittsburgh and put up our tents upon an island the lower end of which passed into the city limits.

Regarding the scenery near the island here a visitor—and later resident—in 1786 writes as follows:

“The island might aspire to live with those of the Aegean sea, where the song of Homer drew the image of delight, or where the Cam or Isis, embracing in their bosoms gems like these, are sung by Milton, father of modern bards.” (Hugh Henry Brackenridge’s description of Pittsburgh.) Brackenridge became so enchanted with the “belle riviere” that he purchased a large tract of land upon its banks some 20 miles above Pittsburgh. He became a member of the Pennsylvania Assembly later on, and procured a grant of land from Penn upon which to erect an academy at Pittsburgh. The academy existed as such until the year 1818, when it became the Western University of Pennsylvania.

He was also the first Pittsburgher to make any contribution of note to literature, publishing a volume entitled, "Incidents of the Insurrection in Western Pennsylvania in 1794." Later he published "Modern Chivalry," a humorous, political satire. His son, H. M. Brackenridge, also became known in literature. "Views of Louisiana" and "A History of the War of 1812" being two of his better-known works.

Standing before our tents and looking up the river, we were seemingly out in the country, far from the city. Here and there an isolated house could be seen along the river or high up on the hills. A short distance inland the towers of a large country residence were visible. The large lawns, with their bright-colored flower beds, were framed in upon three sides by dense woods, furnishing quite a pleasing picture.

I guessed that it was the home of some traction magnate; the cook called it the residence of some coal baron, while my Partner insisted that none less than a steel king could afford such a palatial country seat. In the meantime the navigator had been studying the place through the binoculars. Finally he said:

"I can read the name of the place planted in flowers upon the lawn; it's the Allegheny County Poor Farm."

Thus we see that it is but one step from the mansion of the millionaire to the home of the poor, or that extremes touch, or something else. There's a

moral there somewhere, but I haven't the time just now to look for it.

Looking down the river, we see the city, smokestacks and smoke, smoke and smokestacks; in between there are more smokestacks.

Even if the smoke had not betrayed the vicinity of the city, we would have seen it by the altered appearance of the river banks. So far on the trip down the shores presented an ever-changing aspect. In some places the hills rose abruptly from the water's edge; at other places there were high banks where the floods had cut their way into the fields on each side; then, again, a sandy, sloping beach led down to the river. As we approach the city, however, we see that the onward march of industry has claimed the river banks as a convenient place upon which to deposit slag and cinders from the mills; the banks are filled out as far as possible, the refuse is disposed of and new mill sites made.

As our camp on the island was to be the last one on the trip we had allowed our provisions to dwindle down to very meager quantities.

Our last breakfast as campers-out was a rather slim one, in consequence, we simply made a meal of odds and ends of supplies; no one cared to row over to the Pittsburgh or the Allegheny side of the river for milk or sugar, so we drank our coffee without. The crew had even forgotten all about his favorite breakfast food. Not even the knowledge that he could purchase a package of peas or frazzled farina tempted him for a minute to go and get it.

His *Leitmotiv* at breakfast now is no longer a sweet cereal song, he does not long for something that is just as nourishing as a pound of meat, he wants his pound of meat.

Camping out caused him to change his opinion of patent, ready-made, pre-digested, albumenized, nitrogenized, rolled, flawed, chipped or roasted foods that are good for the breakfast of the baby, the brain worker, the mill worker, the athlete in training, or that can be used to feed your auto if you run out of benzine.

And I'm glad of it. If this breakfast food habit had kept up it would soon have been as bad here as the tea drinking habit is in England.

As bad? Nay, it would have been worse, for we always go to extremes in everything.

I shudder even now when I call to mind my first experience with the tea-drinking habit in England. It was awful.

I went over from Munich. They have tea there, it is true, but they boil the leaves mainly to get a wet, soppy mass of leaves to use in sweeping carpets. At times a cup of tea is made to drink, but this is usually only for English tourists, and for these only, as a usual thing, for the first day or two of their stay. After that time the tourist generally becomes acquainted with one of the *braeus* served there, the Pscherrbraeu, the Zacherlbraeu, the Sterneckerbraeu or the Hofbraeu—just to mention a few of them.

Then he loses his taste for tea. Well, I had passed

some time in Munich and went from there to London to see Professor Brown, a colleague in the Isothermic field. Brown met me at the depot; after we had passed the time of day and he had asked me how I liked England, he suggested that a cup of tea would be acceptable after my run over the Channel.

He suggested a cup of tea in such an innocent, child-like way that I sized him up as a great joker on the spot. I took it for granted that his "cup o' tea" was merely a *nom de guerre*, a *nom de plume*, a pseudonym, or something of that kind.

"I'll go you," said I, and we went. Then when the tea came, REAL TEA, I just drank it as if that had been my favorite tippie from childhood on.

If Brown thought that I would make any remarks about it he was grievously mistaken. I simply saw right through his little joke and rubbed it into him by ordering another round.

"There, Mister Brown," said I to myself, "I'll show you that I'm an American and can see an English joke just as fast as it can be made, see it and hold up my end of it with the next man."

We drank three rounds of tea and then Brown had enough of it.

In the evening I met a few brother scientists at the clubhouse for a discussion of our work. Later on we had refreshments.

I came to sit beside a slim young man, whose face seemed to me to be pallored o'er with the sickly hue of thought. But it wasn't. It was tea.

"Hech, mon, join me in a pot o' tea," said he. "You dinna ken that they brew it to perfection here."

"Aha!" said I, "another joker. I'll join him,"



"Wept Tears of Tea."

and I did. And it *was* tea that came. But I drank it, and then I ordered more and praised it, and ordered still more and raptured over it.

And there we sat, the two of us, and filled our-

selves up with tea just as they fill street sprinklers from the water plugs.

I was bound to make that fellow tired of his joke, but I couldn't. When we parted he fell upon my neck and wept tears of tea and called me brother.

And that's the way it went during my entire stay. They were not having sport with me at all, were not even trying to. They drank the tea because they really liked it and because it seemed to be the proper thing to drink at all times and places.

But, no, it was not all tea. There was one exception. I was out one night with Lachlan Mac-Taggart taking in the sights. Becoming weary and athirst along towards the end of the night, I suggested to Mac that we go and take something.

"Here," reasoned I, "is a genuine Scot, one caught wild upon the highlands within so recent a time that he still has the odor of peat smoke adhering to his clothes, he will surely select the proper kind of refreshment.

"Let's step in somewhere," repeated I, "and take a little something," not as if there were any particular hurry about it, but as if it were a mere matter of course.

"Weel, yir richt, ma mannie," said he. "Keep's a' it wass a waesome feeling a hae myself, we'll juist tak a guid bowl o' porritch."

That was the last straw; it broke the 'Campbell's' back. For a few minutes that street looked as if a cyclone and a whirlwind were having a catch-as-catch-can bout with a dozen wildcats. When quiet

came and what was left of my hielan laddie, my bonnie chiel, lay spilled about upon the ground like a bowl of bonny-clabber dropped from the roof of a ten-story house.

Years have passed since then. I have grown older and view some things in a different light now. If this should meet Mac's eyes let it tell him that I forgive him. He was brought up wrong.

The tea-drinking habit of England will be a diversion of childhood when compared with the breakfast food habit here in America in a few years.

If you are feeling downhearted, then, of a morning, the proper food to take will be a pound or two of whirligigged wheat. On the other hand, if you are feeling like a little lamb in a clover field, a dish of mushed millet will be the proper thing.

If you are all run down and fagged out, then a lengthy diet of Bruised Barley Broth, the great Blood, Bone, Brain and Brawn Builder, is needed.

In wintertime you'll take Phoebe's Pancake Paste. In summer, there'll be nothing more refreshing for breakfast than a can of Cold Cream of Corn.

There are quite a number of prepared foods that are really valuable as foods. Too many of these preparations, however, are sold at exorbitant prices and have but little food value, at that. Thus, a certain so-called "predigested" food is composed chiefly of the commonest grade of commercial glucose, one dollar's worth of the "food" could be purchased as glucose for four cents.

A so-called "pancake flour," sold with a lavish

expenditure of printer's ink, consists of wheat middlings and small quantities of rice flour and cornmeal.

Another preparation, lauded to the skies as an exceedingly nourishing food for infants, convalescents and aged people, consists of the poorest skimmed milk, combined with a little sugar and some cocoanut butter, the whole dear at a cent or two per pound, yet a gullible public pays twenty-five for it.

SLICE XIII.

We encounter a wild tribe—The Workshop of the World—Iron and steel, and other things—George Washington's adventure.

A COUPLE of tents pitched on the bank of the island a short distance above us showed that we were not the only campers-out on that little patch of land. A weird and wonderful flag floating from a staff in front of the tents aroused our curiosity the moment we saw it; skull and crossbones with a coiled snake over them gave the flag a piratical look, while the word "Dates," painted in large red letters below, made one think of the Arabs, and lions and other wild things of the desert.

As soon as we had landed our effects, the cook went off a-visiting, according to the manner of cooks, to find out something about our neighbors.

By the time our tents were up and things straightened out a little, he returned with his gossip. The tents were inhabited by a tribe of boys from one of the public schools of Pittsburgh. As they all belonged to Division 8 of the D class, they had coined a word to show that fact; they called themselves

"Dates." They were not very particular about the one name only; they also called themselves "Daisies," "Peaches" and "Birds," and explained that these three names, in their case, meant one and the same thing.

The design upon their flag was merely intended to show passersby that the dwellers within the tents belonged to that class of boys known as "terrors." After supper they all gathered about our camp fire and talked about school days and schoolboys. At first the boys were somewhat shy and backward, but they gradually became more and more communicative as the cook led them on.

Upon my asking them if they had a goodly number of "Pilgrim's Progress" and "Sandford and Merton" prizes, books highly prized by the youth of former times, they felt hurt. One of them even remarked that they went to a school, and not a kindergarten.

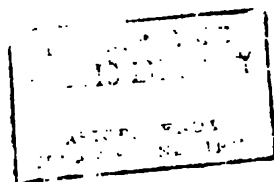
"Sanford and Merton," said one. "Great Caesar! mister, when was you born, anyhow? And the 'Pilgrim's Progress?' Say, if that old 'Jacob Faithful' guy that goes about climbing hills in it would climb our High School hill with us D eights for about a week, he'd bring some life into his progress from then on.

"After a week with us he'd say we were the warmest bunch of babies he ever met trundling down the pike."

"Are you then so awfully bad?" said my Partner, in an anxious voice, looking at the crew at the same



A RIVER COAL TIPPLE.



time and thinking, no doubt, of the time when he would become a High School boy also.

"I am sorry to hear from your own lips that you are not models of exemplary conduct at school," said I; "but then I suppose your opinion of your own badness must be taken *cum grano salis*," and at heart I envied the cubs the fun they had and would yet have before their school days were over.

"Well," answered one of the boys, "our D class was a terror while it lasted. The June examination, however, broke us all up and scattered us among other classes, but we made things hum while we were together.

"Why, every week or so one of the professors would get the one or the other of us into a corner and would ask us if we didn't want to be transferred into one of the other classes; told us how easy we'd have it there, and all that. But we saw through their scheme, and stuck together. They couldn't break up our class that way, I tell you."

"But what did you do," said my Partner, "to get your evil reputation?"

"Oh, well, we didn't do so very much, nor anything just what you might call especially bad; but then what we did do we always managed to do in such a manner that everybody saw or heard of it right away, with trimmings and fringes. And one little wicked act, done openly, will spread quicker and farther than twenty good ones done on the dead quiet. People don't go about bragging about the good things they saw you do, but they are worse

than a cyclone in scattering bad things they heard of you."

"Well, but what did you do?" cried the navigator, in despair. "Go ahead, steamboat, toot your whistle."

"Well, you see, it's this way," said one of the terrors; "we can't very well tell of what we did and what we didn't do at school. Our teachers' heads ain't on the United States postage stamps yet, and we're going back to school in September; it wouldn't be fair to tell tales out of school. But we didn't get our reputation exclusively at school; we worked overtime outside."

"Why," said one of the boys, "one little bag of prunes—and us—got the whole trolley system almost upside down. It happened about this way: When they changed the schedule on the Bloomfield line, every Bloomfield car going west had to stop at Main and Penn in order to give three cars of other lines the right-of-way. This always gave a stop of six or seven mintues. One morning a kid came out of the grocery store at the corner there and gave our motorman a bag of prunes; then, while we waited for the other three cars to pass, the motorman sat down and ate them.

"An old lady sitting beside the Spry One there saw it, and then asked Spry why we had stopped.

"Spry looked at her like a little calf in its innocence, and then said:

"'Oh, we alwaith thop here, we mutht thop to let the motorman eat hith pruneth,'

"'What!' screamed the old lady, 'stop here so that that man can eat prunes?'"

"'Yeth, mam,' said Spry, 'he delayeth uth often tho that we get late to thkool and then get four demerith from Jaggerth. But he ith through now, we'll thtart prethently.' Of course, Spry had seen the last car waited for pass us and knew we would be off next.

"Then our motorman balled up his empty prune bag and fired it at the kid on the pavement, turned the switch and started on again.

"My, but the old lady was mad; she fairly sizzled with heat. Then she asked Spry if he knew the motorman's name, he gave it to her and watched her write it down in her note-book. When we passed the starter's office at the car barns she went in to enter a complaint against Mark Orelus, the motorman. But the conductor tipped him the wink and he sent the old lady to the downtown office with her complaint. I guess she's running about yet.

"Another time we were coming out home on the Liberty Avenue line with a half dozen preachers on board, going out to some kind of a pious pow-wow or other. Every now and then they'd tackle the conductor and ask him if they were soon at Thirty-fourth Street. Finally he got tired of it and went out on the platform and shut the door.

"Then they turned to the Spry One and asked him to tell them when Thirty-fourth Street came, called him a little boy at that. You wouldn't like to be called a little boy in a trolley car, would you?

"Well, when the car got to Thirty-third Street Spry got up, opened the door and yelled out like a wild Indian:

"'Next block is Thirty-fourth Street. All out for the Iron City Brewery! Car stops in front of the office; brewery entrance up Thirty-fourth Street!'

"Of course, everybody got onto the joke right away, but you'd ought to seen the ministers, and when the car stopped people almost broke their necks to see where they went. Course the people in the car talked about it and us, later on. Of course, they had it that the whole crowd went into the brewery and that we gave them away."

"But our young friend lisped awfully in the other car with the prunes and he does not lisp now, how's that?" said my Partner.

Then they looked at one another and laughed. That was simply another amusement of theirs.

"You see," said one of them, "we once got a new teacher, a young lady just fresh from Vassar or Wellesley, and she knew as much about boys as a fish does of flying. Some of them know a little, like a flying fish, and others know nothing at all. One minute she'd talk to us as if we were a pack of girls, then she'd switch off and talk dignified as an old professor. One trip she called us gentlemen and the next time it was simply 'you boys.'"

"Of course, we had it in for her, right away. The Spry One got an awful lisp so that no one could understand him, then some of us got our names ex-

changed somehow. I was Tom there one day and Tom me, the next day I was myself and so was Tom, and she said she could not understand how she made the mistake.

"Well, she stood it just one week, then she went back to college again, or got married or something else. Of course, she judged us by that one week."

"And you never got into trouble," said my Partner; "I should think such actions would certainly cause you to be disciplined severely in due time?"

"Oh, we did not care for that. A couple of us got too fresh once and the whole faculty sat on us and suspended us for two days; then they sat on us again and took us back. That's no punishment; that's merely giving you two days' vacation."

"One of us got it once, though, and he got it at home," said one of the terrors. "It came about something like this:

"He had a banana and an orange left over from lunch. On the way home he went through the car and called out oranges and bananas, just like a train-boy. Of course, that was too tame for us, so the next day at lunch hour we rolled up a lot of fake cigars out of brown paper, and on the way home Jim went through the car with them and offered them to the passengers.

"'Here you are, gents,' he yelled, 'have a seegawr, the only superfine seegawr made, only a nickel each; the kind me fawther smokes,' and a lot more stuff like that. But when he got up to the end

of the car he stopped dead short and then came back on the platform looking kind of funny.

“‘What’s the matter; sold out?’ said we.

“‘Matter,’ said he, ‘I wish I was a microbe or a germ again in a mud puddle 10,000 years back. See that old gentleman up in the corner there? See him? Well, that’s my father.’”

Schoolboy days and student days, how often have you been described in prose and verse? Who that has passed through them will ever forget them? Success or failure may come in later years, the dreams of youth may materialize, or remain dreams, but the happy days at school will never be forgotten.

Veterans of wars will come together and go over their marches again; the aged statesman will never tire of telling of how he brought about great reforms, or even saved the country. He throws down his newspaper at times out of patience with the bunglers of to-day.

The disciples of St. Hubert and Isaak Walton weary the uninitiated, at times, with the minute details of their successes with gun and rod.

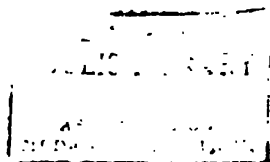
But they all meet on a common level when they drift back to their schoolboy days. The soldier forgets his battles and the statesman lets his country drift whither it will—they are all back at school again.

* * *

After leaving our camp on Six Mile Island a half hour’s row brought us to one of the many blast furnaces in and about Pittsburgh, where we landed



COURTESY - PITTSBURG CHRONICLE TELEGRAPH.



and viewed the process of getting iron out of its ores.

"Iron is one of the most important and valuable metals known to man. It is——"

"What!" interrupted the cook; "the most valuable?"

In its way the statement is true. If we were suddenly deprived of iron entirely we would very soon discover that none of the other metals could replace it. If necessary, we could do without all of the other metals, gold, silver, lead, copper, tin and all the rest of them, but not without iron.

Gold is undoubtedly valuable as a monetary basis, but it is by no means the king of metals found in the United States. The total yield of gold and silver combined in this country in 1900 was less than \$160,000,000, while that of pig iron was nearly \$250,000,000. Pennsylvania, of course, produced far more pig iron than any other State. Colorado is a great gold-producing State, but the value of its annual output of the yellow metal is trivial in comparison with that of the black metal produced from the soil of the Keystone Commonwealth.

The low melting point of lead and the ease with which it can be rolled and hammered renders it valuable to man; copper cannot be readily replaced as a conductor of electricity; quicksilver is valuable on account of its property of expanding by heat and contracting through cold, it would be hard to construct thermometers and barometers without it. And so it goes with all of the other metals. They all

have some one single characteristic which makes them valuable, but none of them have the manifold ones we find in iron.

“Why not melt two or three different metals together and so get a metal containing all of the good properties of the single ones?” said the crew.

By melting different metals together we get an alloy, but it always has properties and characteristics entirely different from those of the individual metals composing it. Thus pure gold is too soft to use by itself, by alloying it with copper we harden it. Gold alone and lead alone can be rolled and hammered out into sheets like thinnest tissue paper, but if we melt gold and add just a little lead, the alloy becomes so brittle that it cannot be rolled out into a thin sheet.

If we melt various metals together, the melting point of the alloy is always far from that of the individual metals in it. Thus bismuth melts at 507 degrees Fahrenheit; lead melts at 607 degrees, and tin melts at 442 degrees. If we fuse these three together, however, we get an alloy that will melt in boiling water. It melts below 212 degrees.

The three kinds of iron met with daily are cast iron, wrought iron and steel. Cast iron is always made first, out of it the others are made.

The ease with which these changes can be made, the valuable properties of each of the three varieties of iron, and the comparatively low cost of each of them serve to render iron invaluable to us.

We can make an iron wire of such a soft nature that it can be tied as readily as a silk thread.

We can melt iron and cast it into any desired form. We can heat it and thus soften it, then it can be hammered into any desired shape, or two pieces can be welded into one. We can harden it to such a degree that it will cut all other metals.

A few cents' worth of iron in the form of a steel watch spring or the mariner's compass are worth more than gold to man. No other metal can replace iron in making these two articles.

If we take an iron hoop, moisten it with water and then allow it to dry we will find that the surface of the hoop has become covered with rust. If we repeat the operation over and over we will finally convert the entire hoop into the new combination, iron with a certain something else it has taken up. This invisible something is a gas called oxygen. It forms part of all water and air. In our case it has combined with the iron to form oxide of iron. We have formed an iron ore.

In the ores found all over the earth the iron is combined with many other elements beside oxygen. We have ores containing sulphur, phosphorus, and silica, for instance. But let us go back to the pure iron rust.

The iron is combined with the oxygen simply because it liked it. The chemist, however, calls this liking "affinity." Now, if we subject this combination of iron and oxygen to the action of some other element having a greater affinity for oxygen than

the iron, we will decompose the iron compound and get iron in a metallic state.

To this end the iron ore is melted in furnaces with limestone and coke. These so-called blast furnaces derive their name from the fact that a blast of hot air is forced through the furnace to aid the melting process. The mass of iron ore and limestone melts, the oxygen leaves the iron and, along with all other impurities in the ore, forms a molten slag floating on top of the melted iron at the bottom of the furnace. After due time the slag is drawn off through an opening in the furnace. It is run into iron cars and hauled away to the dumping ground. The melted iron is run off into molds made in sand in front of the furnace. There are several hundred of these molds to be filled at each casting. The liquid iron flows down a main channel from the mouth of the furnace; from the main channel it is led off to the right and left; from channel to channel it flows until the entire charge has been drawn from the furnace.

These molds looked to some old-time furnace man like a row of little pigs lying beside their mother—the bars were called “pigs” and in course of time all raw cast iron became known as pig iron.

The uses to which cast iron is put are manifold; gas and water pipes, stoves, lampposts, pots, kettles, wheels and a thousand and one other large and small objects are cast out of it. Its use is limited, however, by its brittle nature.

Let us go back to our hoop again; we can bend

it backwards and forwards very often before it breaks. If, however, we take a piece of gas pipe or a stove lid and bend them they will break immediately. We might as well try to bend a sheet of glass. There is, therefore, a great difference in two irons, the one of which the hoop has been made and that of the gas pipe. To make an iron which can be bent without breaking we must convert cast iron into wrought iron.

Leaving the blast furnace we took to our boat again and started on down the river to see the second stage of iron-making, the production of wrought iron. Rowing upon the river now is not as pleasant as it was a few days back. The forest trees have been replaced by a forest of smokestacks. The winds which then brought us fresh odors from the fields, and the songs of birds, now bring us the sulphurous smoke of the furnaces and the thousand and one noises from the mills—the many-toned whistle, the rush of escaping steam, the clang of hammers and rising above all we hear, at regular intervals, the shrill whistle of a steel saw cutting through iron; starting near the bottom of the scale, the sound gets shriller and higher pitched until with a long-drawn, sighing wee-ow-u-uh the cut is ended.

A short distance below our blast furnace, near the foot of Thirty-seventh Street Pittsburg, we came to a historic spot. Here General Washington, then a Major, crossed the river in 1753 and narrowly escaped drowning, and later freezing to death. The site of Pittsburgh was considered so important at

that time even, that the strife for its possession was a constant one. First England owned it, then France, then England again, to be followed by Virginia, the United States and finally Pennsylvania. The French first called their halting place here "The Assumption of the Blessed Virgin of the Beautiful River." Later on they named it Fort Duquesne; the English called it For Pitt and finally Pittsburgh. The French built a line of forts from the Canadian line to Ohio and claimed the land. As the English claimed the same territory Governor Dinwiddie, of Virginia, sent Major Washington, then barely 21 years old, into the disputed territory to find out what the French and Indians had in view.

At that time the Indians still had numerous villages in this vicinity. The Delawares had located on the Pittsburgh city side of the river and the Shawnees were opposite them, on the Allegheny city side. These two tribes sided with the English; the tribes at the headwaters of the river siding with the French.

Washington went up the river as far as Franklin. There he met the French officers and was told that they not only claimed the entire region, but would also commence the erection of a fort at the junction of the Allegheny and Monongahela rivers in the spring. Washington thereupon started upon his return trip to Virginia, reaching the mouth of the river December 23, 1753.

Regarding his adventures here he writes in his diary:

"We reached the river at Shannopinstown, the Delaware village. We expected to have found the river frozen, but it was not, only about fifty yards from each shore. The ice, I suppose, had broken up above, for it was running in vast quantities. There was no getting over but on a raft, which we set about with but one poor hatchet and finished just after sunsetting. This was a whole day's work. We next got it launched, then went on board of it and set off, but before we were half way over we were jammed in the ice in such a manner that we expected every moment our raft to sink and ourselves to perish. I put out my setting pole to try and stop the raft that the ice might pass by, when the rapidity of the stream threw it with so much violence against the pole that it jerked me out into ten feet of water; but I fortunately saved myself by catching hold of one of the raft logs.

"Notwithstanding all our efforts, we could not get to either shore, but were obliged, as we were near an island, to quit our raft and make for it.

"The cold was so extremely severe that my companion had all his fingers and some of his toes frozen; and the water was shut up so hard that we found no difficulty in getting off the island on the ice in the morning."

The island upon which Washington passed the night was called Wainwrights Island in later years. Mills and railroads have filled up the channel between it and the Pittsburgh shore; the filled-in ground and the island itself are now covered with iron mills and foundries. We landed a short dis-

tance below the former island and saw the second stage in the manufacture of iron carried out. We saw cast iron converted into wrought iron.

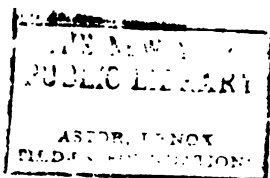
The cast iron contains various impurities; to convert it into wrought iron they must be removed. This is done by a process called puddling.

Several hundred pounds of the cast iron are placed in a furnace and heated to a white heat, then the puddler, as the worker is called, works or puddles the softened ball of iron with heavy iron tools. He kneads it about in the furnace and this exposes fresh surfaces to the action of intense heat. The impurities melt and form a liquid slag. This is run off into little iron cars. The iron is then kneaded up into a large ball and is picked up with heavy iron tongs, suspended by chains from a track overhead, and is carried to the steam hammer. There the ball is pounded out into a bar about four feet long and six inches square.

This working over in the furnace and under the hammer has converted the cast iron into wrought iron—it was first cast and then wrought into shape. The bars of wrought iron are now ready to be rolled out into sheets, bands or bars. To this end they are heated to redness and are then passed through rolls in the rolling mills. If a plain sheet is desired, the bar is passed back and forth between two heavy iron rolls, with smooth surfaces, until it has been rolled down to the desired thickness. If bands for hoops are desired the rolls have corresponding openings cut into their surfaces, varying in size from end to end of the roll. In passing through the first open-



"KEPT AS A CURIOSITY."



ing in the rolls the bar of wrought iron is rolled out to twice its length; its diameter is lessened in proportion. This increase and decrease continues, until finally a band of iron sixty feet, or more in length and an inch or so wide emerges from the rolls.

In rolling rods the grooves in the rolls are of corresponding shape, for round rods a half-round groove in the upper roll faces a similar one in the lower roll, the size of the grooves also decreasing from end to end of the roll.

The sheets, bands and bars or rods are now ready for the other mills; there they are made up into boilers, tanks, hoops, nails, chains, bolts, pipes and innumerable other articles.

The third form of iron is steel. This is made either direct out of cast iron or out of the wrought iron. The most important process is the Bessemer method of converting cast iron into steel without first making it wrought iron. In the Bessemer process the impurities in the cast iron are removed, burnt away, in fact, by blowing a stream of air in a fine spray, through molten cast iron. This is done in the "converter," a huge iron crucible, lined with fire bricks. In this process a charge of several thousand pounds of cast iron is converted into steel in barely twenty minutes. According to the older process it would require days and weeks. The converter swings upon pivots in a massave iron frame, so that it can be depressed or elevated at will. It is filled with a charge of molten cast iron and then

air is forced through the liquid iron by means of powerful engines.

The air first passes through fire clay tubes; one end of these is closed with a fire clay plate filled with small holes. In this way the air is forced through the molten iron in countless small bubbles.

When the charge is finished the melted steel is poured like water from the converter into molds. Out of steel, boiler plates are made, railroad rails, car springs, bridges, cannon and projectiles, beams for iron buildings and the countless other articles which cannot be made out of cast iron or wrought iron.

At some uncertain time, many centuries ago, some worker in iron discovered that red-hot iron plunged into cold water became far harder than if allowed to cool slowly in the air. Another investigator found that red-hot iron cooled in oil became harder than if cooled in water. The art of tempering steel had been discovered.

From then on, up to some two hundred years ago, slow but gradual progress in steel making was made. There were no large furnaces, foundries and mills then, the smiths of that day worked on a small scale and each claimed some great secret process for making an especially good steel for swords or armor.

But about two centuries ago a steel worker in Sheffield, England, conceived the idea of melting steel in crucibles and thus getting a uniform product. From that time on experiments were conducted in a more rational way, it soon became pos-

sible to obtain a steel of uniform composition and hardness. Sheffield steel soon became known the world over as the best.

From here to the mouth of the river we have mills of all kinds to right and left of us, making the countless articles of iron that gave Pittsburgh the name of the Iron City. Here, in this Workshop of the World, everything of iron is made, from a paper of tacks to a sheet of armor plate; from a miner's pick sent to Alaska, to a steel steamer sent to South America; a steel saw for South Africa or a locomotive to Japan. But other things are made in the Workshop of the World beside articles of iron.

In this Workshop we find also the largest cork factory and the most extensive pickle and preserving works in the world. But the Workshop excels not only in the vast size and enormous output of its mills and factories, quality is the conqueror in some cases, not quantity; thus if any up-to-date observatory anywhere between New Zealand and Nova Zembla wishes to procure the most delicate, reliable and accurate astronomical instruments they send to Pittsburgh for them.

If one nation wants improved gun sights, to enable them to shoot at an enemy several miles away, they send to Pittsburgh for them. If the other nation wants exact range finders, to tell them just how far they must shoot back in reply, they also send to Pittsburgh.

SLICE XIV.

We go through the Workshop—King Coal and a few facts—Finish of the Loaf.

ONE morning, during her honeymoon days, Mother Earth was feeling especially contented with herself and surroundings; she looked herself over to see if she could not find some especial spot upon which to confer a few extra favors.

Her glance chanced to fall upon the little strip of land now called Pennsylvania. "Well, well," said she, after a little examination, "that little piece of country can surely be satisfied with itself, and what I have done for it; the dwellers there for years to come ought to be satisfied with my gifts to them. They have large and small rivers, the country touches the ocean and the great lakes; they have broad and fertile plains and hills covered with forests; they seem to have everything they could desire! But I will do even more for them; I will put a wealth of stores underground for their use. Let me see! What all can I put there?

"Building stone of all kinds, salt, oil, iron, gas and coal, and while I am about it I will give them more and better coal than will ever be found elsewhere, bituminous and anthracite. Then, with coal

and iron at hand, my children there in course of time will rule the world.

“Other parts of my domain may have gold, silver and precious stones in abundance, but to get them they must first pay tribute to coal and iron.”

And so it came to pass.

Both anthracite and bituminous coal are found in abundance. The anthracite coal is a hard, shining mineral burning with a faint blue flame and intense heat. It contains about 90 per cent. carbon. The bituminous coal is soft, containing about 80 per cent. carbon and carrying quantities of other elements, for instance, sulphur. The amount of sulphur present in the coal is important, the product of its combustion being sulphurous acid, a gas very destructive to vegetable life. The amount of sulphur in the coal also determines its value, in an indirect way, to the iron industries. If we heat coal in a closed vessel we drive off all volatile parts and retain only a comparatively pure carbon in the retort; this carbon is called coke. Now, one-half of the sulphur present in the coal remains in the coke, hence, if the coal contains too much sulphur we will get a coke out of it which cannot be used in smelting iron.

The hills, for many miles up and down the rivers about Pittsburgh, contain coal. Mines were worked in the city limits but a few years ago.

The openings into the coal mines are usually near the top of one of the hills. There a tunnel is driven into the hill, the vein is tapped and then the miners follow the seam of coal wherever it

leads; in some places the vein will lie perfectly level and straight; then it will suddenly turn up or dip down, to right or left; it may lead over the hills to the level country behind or it may dip down and pass under the rivers.

From the pit mouth an inclined railway leads to the river or railroad below. Upon this incline the coal is taken down to the railway cars or the coal-boat. The small coal cars are attached to wire cables, an empty car being drawn up whenever a loaded one comes down.

As the stage of water in the river was usually too low to float loaded coal barges, dams were built across it to form "pools" of deep water. From these pools the loaded barges are taken through locks in the dams to the Pittsburgh harbor. There they are collected and held until a rise in the river gives enough water to the Ohio to float a tow down. And sometimes the boatmen have a long wait.

The summer has passed and very little rain has fallen; at times the rivers will rise a foot or two and then sink back to nothingness again. Finally the rains come in sufficient quantity to give the proper stage of water in the rivers. Presently the gauge at Oil City shows three feet, then four, then five and still rising; from the headwaters of the Monongahela similar reports come. Then the harbor at Pittsburgh teems with life, busy tugs steam about gathering loaded coal boats and barges. All seems confusion, but out of the midst of it there will presently float a large steamer with a dozen or more loaded coal boats and flats collected about her,

whistles will bellow hoarsely, bells will clang and then the Iron City will start on her long trip down the Ohio and Mississippi, or the Williams will race with the Smoky City to be first out of the harbor.

The bustle and hurry in the harbor lasts for two or three days, then comes quiet. Every boat that can steam or float is on the way down the river; 25,000,000 bushels of coal are on the water. For a few days a long procession of boats passes through the locks in the dam below Pittsburgh and then the harbor is deserted.

And then the coal shippers sit down and wait patiently until some more rains come and cause another rise in the rivers. Perhaps the stage of water gets so low that no empty coal barges can be brought up from the South, then the mines simply shut down and the miners take their turn in waiting for rain. Steamboats coming up the Ohio cannot get to Pittsburgh, they tie up at some convenient point and send their crews up by rail. Then the crews assist the shippers and miners in waiting for rain.

Of the towboat Williams we must speak more respectfully, however. That boat deserves to be called by her full name, the Joseph B. Williams. She must be given more than passing mention.

If an ocean steamer makes an unusually fast voyage, carries an exceptionally large cargo or a celebrated personage as passenger, the fact is made known to the entire world.

But if a steamer leaves Pittsburgh with enough

coal to provide fuel for a small town for an entire year, the fact is barely mentioned.

The manner in which this coal traffic is carried on upon the river excites more wonder than its immense volume.

Pittsburgh is the largest coal-producing center in the world, one single firm in the city producing and distributing more than 20,000,000 tons yearly.

Industrial centers 2,000 miles off are supplied with coal from Pittsburgh, by way of the Ohio and Mississippi rivers, in the greatest loads and by the most economical methods to be found in the whole world.

The coal is shipped in "coal boats" and "barges." An average-sized coal boat will carry 25,000 bushels. The steamers propelling these loads are all stern-wheel boats. They do not pull or tow their loads, as the name towboat would indicate, but push them down or up the rivers.

In building up a tow of boats and barges four of these are always fastened in front of the steamer in such a manner that a space the width of the steamer is left clear in front of it. This is done in order to allow the water to pass under the steamer easily and thus reduce resistance as much as possible.

To these four barges at the head of the towboat a second tier is lashed; to it a third and so on until the desired number is reached. The single barges and boats are fastened together with heavy cables, wire rope and chains, so that they form one compact body. This is handled as if it were an individual boat.

All loaded barges or boats in a tow are not always consigned to the same landing. Here and there along the river one or more barges may be dropped. This is usually done without impeding the progress of the tow to any appreciable extent.

A few miles above the desired landing the especial boat or barge is cut loose from the tow, and is allowed to drop back, on the outside of the rear boat on the side next to the coming landing place. One of the crew then rows ashore with one end of a cable, the other end of which is attached to the barge. On shore he fastens the cable to a post provided for this purpose, or wraps it around some convenient tree. The boat is then cut loose from the tow and is floated by the current of the river into the landing.

A short, sharp pull brings the man back to the steamer, slowed up to this end. It then proceeds on its way to the next landing.

Enormous tows are also taken straight through from Pittsburgh to New Orleans. Thus on a recent trip the Joseph B. Williams took a tow of thirty-four monster coal boats, loaded with a total of 1,172,000 bushels of coal, from the one city to the other. In weight this shipment represented 34,000 tons. To haul this coal down by rail would have required forty trains of forty large coal cars each.

This is the largest quantity of coal ever taken out of Pittsburgh at one time by any towboat. The steamer Sprague holds the record for the largest tow on the lower river, having taken 54,000 tons at one time down the Mississippi.

Both these boats are owned by and carry the

output of the mines of the Monongahela River Consolidated Coal & Coke Company.

At the mouth of the river we passed under the last bridge spanning it, built so near the junction of the rivers that at times the Ohio (or during exceptionally high water, the Monongahela) will turn around the "Point" and take a look up the Allegheny from under it.

This bridge is one of the wooden tunnel kind and seems strangely out of place in the Iron City. It is kept there, however, merely as a curiosity. On all sides we see huge structures of steel and iron, some of them spanning the river suspended from towers by means of gracefully drooped steel cables, others, again, are massive structures planted upon solid piers, as if put there to last for ages. Bridges of all sizes, shapes and styles, no two alike, just as if the builders had set out to have a permanent bridge exposition. And then, to show the difference between the old and the new, we find a long, squat, wooden tunnel of a bridge which must rest heavily upon four stone piers in the river in its flight from shore to shore.

Slowly we drifted down the stream. On the one side of the boat we could finally see the muddy water of the Monongahela, on the other the clearer water of the Allegheny. Slowly the waters mixed, one became lost in the other and we floated upon the river formed by the union of the two—the Ohio.

We had reached the end of our loaf.

THE END.

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